VOL. LX MARCH, 1922 NEW SERIES VOL. 13, No. 6

JOURNAL
of the
American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW
(Original Official Organ U. S. Vet. Med. Assn.)
EDITED AND PUBLISHED FOR
The American Veterinary Medical Association

INDEX NUMBER

CONTENTS

Editorial 677

Papers:

Why Health Departments Are Interested in the Tuberculosis Eradication Campaign—W. A. Evans 683
Hog Cholera—R. C. Reed 691
Botulism in Its Relation to Anti-Hog-Cholera Serum and Hog-Cholera Virus—Edw. A. Cahill, H. W. Jakeman and T. W. Munce 702
Clarification of Hog-Cholera Defibrinated-Blood Antitoxin—R. R. Henley 717
Effects Following Improper Methods of Extracting Hypoderma Larvae from the Backs of Cattle—S. Hadwen 724
Laboratory Diagnosis of Poultry Diseases—L. D. Bushnell and F. R. Beaudette 729
Pennsylvania Instructions for the Ophthalmic Tuberculin Test—T. E. Munce 734
The Viscera of the Cow—S. Sisson 736
Herd Efficiency from the Standpoint of the Veterinarian—Earle B. Hopper 738
Tribute on Behalf of McGill Veterinary Graduates to Dean McEachran—W. Reid Blair 756
Address at McGill Veterinary Reunion—Duncan McEachran 761
Dedication of New Colorado Veterinary Hospital—George H. Glover 767
The Fifth Medical Congress of Cuba, With Special Reference to the Veterinary Section—A. Eichhorn 771

Clinical and Case Reports:
Swine Erysipelas—J. C. Quinlan 781
Congenital Ankylosis in a Calf—Thomas B. Carter 782

Abstracts 783

Association News:
Proceedings of the Fifty-eighth Annual Meeting, A. V. M. A. 787
Other Meetings 797

Necrology 803

Miscellaneous 805

Index.

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. *Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue.* Volumes begin in April and October.

Communications relating to publication, subscription, advertisements and remittances should be addressed to JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, 1629 Hobart Street, Washington, D. C. Matters pertaining to the American Veterinary Medical Association and membership should be sent to Dr. N. S. Mayo, Secretary, 4758 Ravenswood Avenue, Chicago, Illinois.

$4.00 per annum Foreign $5.00; Canada $4.25 Single Copies 40 cts. in U. S.

Entered as Second-Class Matter, February 4, 1920, at the Post Office at Washington, D. C., under Act of March 3, 1879. Acceptance for mailing at special rate provided for in Section 1103, Act of October 3, 1917; authorized February 4, 1920.

CAMPHOR

in its

MOST ACTIVE FORM

is

CAMPHOSOL

No Oil—No Fatty Substances

CAMPHOSOL
- Gives IMMEDIATE STIMULATION.
- For INTRAVENOUS, INTRAMUSCULAR or SUBCUTANEOUS USE.
- Does NOT "Smear Up" the Syringe.
- Is an AQUEOUS, ISOTONIC, COLLOIDAL, CAMPHOR SOLUTION.
- Is Sterile.

Read what these Veterinarians say:

Dr. H. M. Rinehart, Galesburg, Ill.: "Camphosol gives more rapid stimulation and is cleaner than camphorated oil."

Dr. C. A. Burnette, Winsted, Conn.: "Being free from oil, Camphosol is more easily absorbed and is superior to camphorated oil."

Dr. W. W. Whitmore, Campus, Ill.: "Camphosol acts immediately and stronger than the oil. I also like it because it does not smear up the syringe."

MILK FEVER, PNEUMONIA, INFLUENZA, COLLAPSE, THUMPS, ETC.

All Respond Nicely With CAMPHOSOL

ZELL-STRAUB LABORATORIES, Inc.

(Originators and Sole Producers of FLAVISOL)

Masonic Temple **Chicago, Ill.**

BIOLOGICS SPECIALTIES FLAVISOL

DISTRIBUTORS:

Ottumwa Serum Co., Indianapolis, Ind.

Grain Belt Supply Co., Omaha, Nebr. Mason City, Ia.

Danville Wholesale Drug Co., Danville, Ill.

Great Western Serum Co., Chicago, Ill.

Dr. J. S. Koen, Bloomington, Ill.

Hock Veterinary Supply Co., Jackson, Miss.

Southeastern Laboratories, Atlanta, Ga.

Cedar Rapids Serum Co., Cedar Rapids, Ia.

Sharp & Smith, Chicago, Ill.

Corn Belt Serum Co., East St. Louis, Ill.

Gregory Farm Laboratory, White Hall, Ill.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

A. T. KINSLEY, President, Kansas City, Mo. N. S. MAYO, Secretary, Chicago, Ill.
M. JACOB, Treasurer, Knoxville, Tenn.

Executive Board

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District; S. E. BENNETT, 3rd District; J. A. KIERNAN, 4th District; C. E. COTTON, 5th District; B. W. CONRAD, 6th District; CASSIUS WAY, Member at Large

Sub-Committee on Journal

S. E. BENNETT J. A. KIERNAN

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LX, N. S. Vol. 13 March, 1922 No. 6

FOOT-AND-MOUTH DISEASE SWEEPS GREAT BRITAIN

FOOT-AND-MOUTH disease has become so firmly established in Continental Europe as to be practically epizootic in many countries of the Continent. Owing to proximity to the Continent, Great Britain is especially exposed to the infection of this disease. While it has appeared at intervals in the British Isles it has not been permitted to become established owing to methods adopted by the British Board of Agriculture in dealing with outbreaks. The policy of the British authorities is to quarantine promptly the area or district in which the disease appears and to slaughter all diseased and exposed ruminants and swine, following such procedure with a thorough disinfection of infected premises. During the past three years there have been repeated outbreaks of foot-and-mouth disease in England, making it necessary to maintain since that time a practically continuous prohibition upon importations into the United States and Canada of cattle, sheep and swine from England.

Scotland during this period had placed an embargo upon the shipment of feed, fodder, ruminants and swine from England

and Wales into Scotland, and until January of this year had, apparently, been successful in excluding the disease. Now it would seem, however, that from some unknown source the disease has broken out not only in England but also in Scotland and that twenty-seven counties in England and twenty-four in Scotland have been quarantined by the British authorities. This information is based upon cable and wireless messages received from the inspector of the Bureau of Animal Industry at London reporting outbreaks in England on January 2 and January 25, and the more serious extension of the disease in England and into Scotland on January 30 and subsequently.

Thus with thousands of cattle infected with foot-and-mouth disease throughout the midlands of England as well as Scotland, that country is faced with the most serious outbreak it has known in 30 years. Officials of the Ministry of Agriculture are working day and night slaughtering infected animals as fast as exposure takes place and meat in some markets has advanced 10 cents a pound as a result of an order forbidding the marketing of any but inspected cattle. Sir Stewart Stockman, Chief Veterinary Officer of Great Britain, has expressed the hope that within a few weeks there would be an end of fresh outbreaks.

He is unable to furnish any exact information as to the source of the disease. After twenty years of study of the infection, he has not been able to ascribe it to foodstuffs or human beings, but to migratory birds and to air currents bringing the virus from infected countries. More directly still, he is inclined to incriminate the stress of weather which causes the migration of birds to his country. He also states that there would not be the present story to tell if some of the local authorities had moved more expeditiously in nipping the disease in the bud. The whole area of Great Britain is included in the range of the disease, the total number of herds infected being 643. The loss in livestock to date on account of the epizootic is put at more than $2,500,000. All movements of ruminants and swine have been prohibited throughout all of England. In the last outbreak of comparable dimensions four hundred thousand head were slaughtered and their carcasses buried before the disease was stamped out.

Owing to conditions existing at this time in Great Britain

and the Continent of Europe, permits for the importation of ruminants and swine from any part of Great Britain or the Continent are not being issued in either the United States or Canada. This action is considered necessary in order to guard against the introduction of this serious disease of livestock into the latter countries.

DISEASE OF LIVESTOCK ON WANE

TUBERCULOSIS, the worst enemy of the livestock industry, is now definitely slated for ultimate control, the plan of attack having been already laid out and successfully demonstrated by the cooperative work of State livestock officials, cattle owners and the Bureau of Animal Industry. The success of the different phases of the plan and figures showing the progress made are given in the annual report of the latter bureau recently issued. In the beginning of the campaign, which began four years ago, most of the work was devoted to cleaning up and accrediting individual herds, but now that sentiment has been sufficiently aroused, definite areas in various States are being freed of the plague, and it is shown that its eradication is as feasible as the cleaning out of the cattle tick in the Southern States.

Although unfortunate entanglements with political issues have delayed the tick eradication work in some localities, the territory relieved from the grip of the cattle tick has been increasing gradually, and the time is not far distant when this enemy of the livestock industry will no longer be a factor in the cost of meat and milk production. More than 32,000 square miles were released from quarantine during the year, and since the beginning of the fight in 1906 more than 500,000 square miles have been freed, which is better than 70 per cent of the original ticky area.

The elimination of hog cholera, on the other hand, is considered a remote possibility, but swine growers are reminded that they may reduce their losses to a negligible amount by precautionary measures, which include the serum treatment. There are a number of other livestock diseases of a serious nature that continually threaten to invade the flocks and herds of this country, but during the year none of them passed the guard maintained at all ports and along the borders. Foot-and-mouth disease in

western Europe and rinderpest in the Philippines are among the most imminent dangers to our livestock.

But the bureau works at both ends of the problem of keeping up an adequate supply of livestock. In addition to protecting against undue losses from various causes, it is working to improve the various kinds of domestic animals in quality and efficiency through breeding experiments, cow-testing associations, bull associations, and the "Better Sires—Better Stock" campaign which has achieved very satisfactory results in stimulating greater interest in the use of purebred sires of all kinds. Up to the end of the fiscal year there were 452 cow-testing associations, with a membership owning 194,000 cows with an average production 50 per cent greater than for the country as a whole; bull associations numbered 158, with 5,064 members who owned collectively 672 bulls of high quality; in the year 2,212 persons joined the "Better Sires—Better Stock" movement, making a total of 4,290 persons who have filed written declarations that they will use good, purebred sires for grading up all classes of livestock kept, including poultry.

One of the interesting developments of the breeding work is contained in the announcement of the making of a new general-purpose breed of fowl that has been named the Lamona. It is the only breed of the class that lays a white-shelled egg, the kind that is in demand on most of the big markets. Progress has also been made in perfecting a new breed of sheep, the Columbia, a type that is well adapted to range conditions and that produces lambs noticeably large at weaning time.

New feeds and new methods of feeding are being tried out at the bureau's various farms, and particular attention has been given to overcoming the tendency to produce soft and oily pork in sections where peanuts, peanut meal, soy beans, rice by-products and mast are fed. In parts of the country where there is an obvious need for a certain kind of livestock farming efforts have been made to have animals introduced and to develop markets for the products. In this way butter production in Tennessee and Mississippi have been increased approximately 50 per cent within the year, and the cheese industry has been established in North Carolina and is being developed in other Southern States.

Among the specific needs of the livestock industry one of the

most pressing is more provision for indemnities for cattle destroyed in the tuberculosis eradication work in cooperation with the States and counties. In some cases a great deal of money and valuable time have been wasted by failure to provide money for the continuation of experimental work that must be carried on uninterruptedly to be of value. Many of the problems that need to be worked out for the good of the industry and the welfare of the country are such as to require years and even decades of study.

A CUBAN-AMERICAN VETERINARY ENTENTE CORDIALE

THE HONORS and courtesies accorded to Dr. A. Eichhorn as the official delegate of the American Veterinary Medical Association to the recent Cuban Medical Congress will evoke, we are very sure, a most cordial feeling of appreciation and reciprocal good will on the part of the membership of our Association and the American veterinary profession toward our Cuban confrères. The National Veterinary Association of Cuba did a most gracious thing in inviting our Association to send a delegate to the Congress as the guest of the Cuban Association, and this invitation was accepted in like spirit when President Kinsley appointed Dr. Eichhorn as our representative. The cordial hospitality with which Dr. and Mrs. Eichhorn were entertained was characteristic of the warm-hearted nature of our Cuban neighbors. The honors conferred upon Dr. Eichhorn were, as he modestly says, a tribute to the Association which he represented.

The rapid progress made and the high ability shown by the veterinary profession of Cuba, as revealed in Dr. Eichhorn's interesting report elsewhere in this issue, are matters for congratulation and appreciation. The cooperative spirit shown by the twin professions of human and veterinary medicine in a general medical congress is both gratifying and commendable.

We hope that this happy occasion is but the beginning of better acquaintance and fraternal relations between the veterinarians of the North American Continent and those of the Island Republic.

LAST CALL FOR PAYMENT OF DUES

One hundred and eighty-nine delinquent members of the American Veterinary Medical Association will not receive next month's JOURNAL unless they pay their dues promptly to the Secretary. A hint to the wise should be sufficient.

A CORRECTION

The name of Dr. H. Phipps should have been included as joint author with Dr. F. M. Hayes of the paper on "Studies in Swine Abortion," presented at the Denver convention of the American Veterinary Medical Association and published in THE JOURNAL for January, 1922, page 435. Although the paper was printed in the form in which it reached the editor and in the exact way it appeared in the official program, it seems that this was not the form in which the authors submitted it. The omission of the name of Dr. Phipps evidently occurred in copying by the official stenographer of the Section.

DETERMINATION OF SPECIES

"The old ones are the best," remarks the *Journal of the American Medical Association*, in its department of "Tonics and Sedatives," as it resurrects this story:

Two negroes were engaged in conversation when one of them became very much annoyed by the persistent attention of a large fly.

"Sam, whut kin' a fly am dis?"

"Dat am a hoss fly."

"Wut am a hoss fly?"

"A hoss fly am a fly whut buzzes 'round cows an' hosses an' jackasses"——

"You ain't makin' out for to call me no jackass?"

"No, I ain' makin' out for to call you no jackass, but you can't fool dem hoss flies."

WHY HEALTH DEPARTMENTS ARE INTERESTED IN THE TUBERCULOSIS ERADICATION CAMPAIGN[1]

By W. A. EVANS, M. D.

Health Department, The Chicago Tribune, Chicago, Illinois

I CANDIDLY CONFESS that I have been out of touch with the situation for a number of years, but, as Dr. Mohler has said, I pioneered the way. I was in the movement when there were no bouquets, but a great many brickbats. The occasion of a tuberculosis meeting was one that the people honored with their absence, or, if they came at all, they came provided with implements of war. To walk into this room a while ago to find the room crowded with intelligent men from all parts of the country, and to learn, not only by their presence, but by the statements from others, just how extensive the movement has grown in the past ten years, was a source of a great deal of pleasure to me. I see some familiar faces. I see some battle-scarred veterans in this audience. I don't feel altogether out of place.

Because of my fight for the Chicago milk ordinance of 1908 I am popularly supposed to be something of a pioneer, and, as such, I am invited to give an answer to the question, "Why health departments are interested in the eradication of bovine tuberculosis?" You will be interested in a brief discussion of that ordinance and what it led to.

The ordinance provided for tuberculin testing with pasteurization as an alternative. It was passed in July, 1908, and became effective in January, 1909. While it was passed without difficulty, it was not permitted to stand without efforts to rescind, by act of the city council; to render nugatory, by acts of that body and also by acts of the legislature, and to overturn by court decision.

It was not the first tuberculin-testing ordinance by any means. In Milwaukee, Louisville and various other places tuberculin-testing laws had been passed and had even been upheld by the courts, but in the long run it had been found impossible to enforce them.

The efforts to rescind the Chicago ordinance of 1908, made in

[1] Presented at the Tuberculosis Eradication Conference, Chicago, Ill., Nov. 25 and 26, 1921.

1908 and 1909, failed. In 1912 the Council passed an amendment which made it possible for a favorable administration to suspend in fact the tuberculin-testing and pasteurizing requirements for certain groups having considerable political influence. In 1916, however, the succeeding administration took advantage of its powers and forced all milk dealers not conforming to the basic requirements as to tuberculin testing and pasteurization to conform. The Illinois Legislature passed a State law providing that no city should pass a tuberculin-testing ordinance. It is the judgment of the best lawyers that the law is either unconstitutional basically, or at any rate does not affect the Chicago situation.

While Chicago was not the first city to pass an ordinance of which tuberculin testing was a principal feature, according to Nathan Straus it was the first city to pass a compulsory pasteurization ordinance. Since 1908 many cities have passed ordinances based on the principles of the Chicago ordinance, and several States have taken similar action. Wherever these ordinances have been passed upon by the courts in Illinois or elsewhere they have been upheld.

In great measure as a result of the action of the Illinois Legislature—which in turn resulted from the fear built up by interested parties out of the features of the Chicago ordinance—tuberculin testing and the eradication of bovine tuberculosis slowed up materially. It is, therefore, retribution that an Illinois State Veterinarian, Dr. O. E. Dyson, should have devised the new accredited plan from which such good results are coming and to further the good work of which you are meeting in consultation.

With these preliminary statements, I turn to the question, "Why are health departments interested in the eradication of bovine tuberculosis?"

Perhaps as good an answer as any is that given by the British Board of Agriculture in issuing rules for the control of bovine tuberculosis, May 1, 1913, which they saw were in the interest of public health as well as of agriculture. (Parkes, Practical Hygiene, 1913.) Stating it in our language, it is because—

1. Bovine tuberculosis causes disease and death directly by infecting human beings.

2. It lessens the supply of milk and increases its cost, thus

indirectly predisposing to tuberculosis and other preventable diseases.

3. It lessens the meat supply and increases its cost and in other ways increases the cost of living. Thus through economic factors it appeals to health departments.

4. It decreases the profits to the milk producer and farmer. This of itself is sufficient to interest the department of health.

5. The relationship between the human and bovine tubercle bacilli leads health departments to the opinion that, while programs for the repression of human tuberculosis which take no note of tuberculosis in other animals may be successful, the time to strike for suppression of human tuberculosis can not come until the program for control of bovine tuberculosis is well advanced.

The first of these points is the only one that I can discuss at any length.

1. *Bovine tuberculosis causes disease and death directly by infecting human beings.*

In Chicago the death rate from pulmonary tuberculosis is falling rapidly. The average rates per 10,000 living, by 10-year periods, were:

1871-1880—16.94
1881-1890—17.81
1891-1900—16.53
1901-1910—15.72
1911-1920—12.95

Rejecting the decade 1871-1880 as possibly quite inaccurate, we find a decline of 1.3 in the nineties, 1.8 in the first decade of this century, and of 2.8 in the second decade, in each instance in comparison with the preceding decade.

In the group of deaths from tuberculosis other than pulmonary the following are the figures:

1871-1880—4.61
1881-1890—2.44
1891-1900—2.30
1901-1910—2.48
1911-1920—2.02

Assuming that the data for 1871-1880 are quite undependable, and beginning with 1880, we find that no decade prior to 1910 showed any improvement, but that the drop of 0.42 in 1911-20

is a greater proportionate drop than that in the pulmonary tuberculosis rate.

These are Chicago figures, and we might assume that the milk ordinance is responsible. This assumption is not entirely justified, for not all the deaths grouped as tuberculosis other than pulmonary are due to drinking milk infected with tubercle bacilli. There is no better summary of the evidence as to what forms of tuberculosis are due to bovine bacilli than that of Park (Public Health and Hygiene, 1920). In discussing bovine bacilli infections of human beings, his conclusions are:

As the result of a large series of cases reported by ourselves and others it has been shown—

1. That children are especially infected, and usually the point of entry is the alimentary tract.
2. That cervical adenitis and abdominal tuberculosis are the most frequent types of infection.
3. That generalized tuberculosis due to bovine tuberculosis is less frequent.
4. That bone and joint tuberculosis is most commonly of the human type.
5. That the meninges are less commonly infected by the bovine than by the human type.
6. That the infection of adults by bovine bacilli is very infrequent.
7. That pulmonary tuberculosis due to bacilli of the bovine type is rare.

On each instance he is speaking of human tuberculosis. The basis of his conclusions he puts in two summarized tables.

TABLE 1

Diagnosis	Adults 16 years and over (Per cent)	Children 5 to16 (Per cent)	Under 5 (Per cent)
Pulmonary tuberculosis	0.2	0	0
Cervical adenitis	4	37	57
Abdominal tuberculosis	16	50	68
Generalized tuberculosis	3	40	66
Meningitis	0	0	15
Tuberculosis of bones and joints	5	3	0
Total number of cases studied	686	132	220

Grand total studied, 1,042 cases, of which 4 were infected with both varieties of bacilli.

However, Park thinks we get a better idea of the importance of bovine bacillus infection in the human subject when we deduce the percentages of certain serious infections due to bovine bacilli. This he puts under what he calls his revised table.

REVISED TABLE 2

Diagnosis	5 to 16 years	Under 5
Abdominal tuberculosis	66	69
Generalized tuberculosis of alimentary origin	60	48
Generalized tuberculosis	20	11
Tubercular meningitis secondary to tuberculosis of alimentary type	0	72
Tubercular meningitis (other than preceding)	0	6

The reason for offering the revised table to replace Table 1 is that it shows the importance of bovine infection in those forms of tuberculosis of children which are of great severity.

The summarized conclusion of Park is as follows: "A careful study of all the factors leads us to estimate that about 10 per cent of all deaths caused by tuberculosis in children under 5 years of age is due to infection through drinking raw cows' milk."

There were 1,096,436 deaths from all causes in the registration area in 1919. Of these, the total number of deaths from all tuberculosis was 106,985, and the total number of deaths of children under 5 from all tuberculosis was 5,830. The estimate of Park is that in 1919, 583 children under 5 years of age died of tuberculosis due to bovine tubercle bacilli in the registration area. This is an estimate only of the deaths due to tuberculosis in children under 5.

The theory of Von Behring as to the cause of tuberculosis in adults is now decidedly in the ascendant. It is that much, if not most, of the clinical tuberculosis of adult life is the result of infection which has lain dormant for more than decade and is developed into a clinical disease by some period of stress. This theory magnified the importance of infections in childhood, and incidentally of infections with bovine bacilli.

There have been no adequate studies to determine the possibility that a bovine bacillus infection in childhood may result in the excretion of bacilli conforming to the human type in adult life. In fact, the typing of bacilli excreted by adults having tuberculosis has been wholly inadequate.

Some other, but more generalized opinions, are as follows:

Park (Public Health and Hygiene, 1920): The bovine type is pathogenic for almost all mammalian animals. The widespread existence of the disease in the cattle from which we derive all the milk renders the bovine bacilli an important etiologic factor in connection with tuberculosis in children.

Parkes (Practical Hygiene, 1913): Children under 5 years of age have a higher mortality from tuberculosis than exists at any subsequent five-year period. This fact seems to point to the disease being maintained among infants through the agency of infected milk.

The British Royal Commission on Tuberculosis, Second Interim Report, says: "The above facts seem to indicate that a very considerable proportion of the human tuberculosis contracted by ingestion and urinary invasion of the abdominal organs is due to tubercle bacilli of bovine source."

Newsholine (Medical Officer, May, 1921), says: "If we are to reduce the amount of tuberculosis and to save children's lives, the prevention of exposure to infection during the first four or five years, and especially during the first two years, is of supreme importance."

Shennan (*Annals of Pasteur Institute,* September, 1920), commenting upon the Calmette-Guérin communications, advises the protection of young human beings by vaccinating them with bovine tubercle bacilli, alternated according to the Calmette-Guérin method.

E. C. Schroeder (JOURNAL OF AMERICAN VETERINARY MEDICAL ASSOCIATION, July, 1921) says that the bovine bacillus is responsible for tuberculosis in children, and adds: "Every case of tuberculosis in the human subject due to bovine bacilli must be charged to intimate contact, in most cases through the ingestion of contaminated dairy products, between persons and tuberculous cattle."

Parkes (Practical Hygiene, 1913): In 25 per cent of all human tuberculosis in children under five years of age and in over 40 per cent of abdominal and joint tuberculosis during this age period, the bovine species of germ is present.

Scott (*Annals of Tropical Medicine and Parasitology,* September 30, 1921) says that in 225 cases of tuberculosis of children in China, 15.71 per cent were alimentary in origin. In adults 12.3 per cent of the cases studied were alimentary in origin.

2. *It lessens the supply of milk and increases its cost, thus indirectly predisposing to tuberculosis and other diseases.*

Parkes (Practical Hygiene, 1913, says that in the early stages the milk secretion is as abundant as ever, nutrition is not interfered with until the disease is well advanced, and even

then the amount of milk yielded, though poor in quality, may not be diminished, and the dairy farmer continues to keep the animal in stock.

I think it is generally held that the tuberculous cow gives even an augmented volume of milk at the beginning of her disease, but that often it suffers both in quantity and quality. The existence of tuberculous infection in a milk cow must cause an increase in the brokerage rate on the food supplied her. However, you know the literature on this phase of the question better than I do, and you are in a better position to evaluate the evidence.

As a health administrator, I have no hesitation in saying that anything which materially decreases the supply of milk, or which materially increases its price, makes against the public health by lowering the rate of growth of children and lowering their nutrition levels.

3. *It lessens the meat supply and increases the cost of living.*

On this point your opinion is better than mine.

Again, whatever increases the cost of living is detrimental to the public health. Those who do hard work must have meat at a reasonable price, or their health suffers somewhat, likewise their efficiency.

4. *It decreases the profits to the milk producer and farmer.*

On the question of decrease in profits to the milk producer and farmer your opinion is also better than mine.

5. One of the most interesting and instructive contributions on the fifth point, namely, the relation of bovine bacillus to the perpetuation of tuberculosis, is that of Schroeder (Journal of the American Veterinary Medical Association, July, 1921). Schroeder says that the bovine form of the tubercle bacillus is "the supremely pathogenic type." It is responsible for tuberculosis in cows, in hogs and in children. Although hogs are infected from cows, the bovine bacilli in them do not infect other hogs and they are not a source of reinfection of hogs. From the epidemiologic standpoint as regards cows, porcine infection is a blind alley. Likewise the bovine bacillus in the young human body multiplies but it does not infect other human beings. Nor is this a source of infection of cows. From the same standpoint, it, too, is a blind alley. The cow is infected by infected cows. The infected cow infects other cows, pigs, human beings, and other animals; the latter but rarely, however.

Every case of tuberculosis in human subjects due to bovine

tubercle bacilli must be charged to intimate contact, in most instances through the ingestion of contaminated dairy products between persons and tuberculous cattle. The human tubercle bacillus, while very important from the standpoint of human tuberculosis, requires no consideration whatever in bovine tuberculosis eradication projects, since cows are immune to it.

Tuberculosis among hogs is unimportant except as it indicates the extent of tuberculosis among cows and the economic waste it occasions. Tuberculosis among fowls is due to the avian type of the bacillus. This bacillus does not cause tuberculosis among mammals nor can the forms of mammalian tuberculosis cause tuberculosis among fowls.

According to this view, no campaign for the suppression of tuberculosis is logical that does not take into account the bovine bacillus.

To meet point 1, universally applied, properly controlled pasteurization would be effective, likewise the universal use of dried milk. But there is great difficulty in getting that kind of pasteurized milk except in the cities. The farmer himself, his family and his livestock, and the people in the towns and smaller cities, will continue using raw milk for a long time. Pasteurization does not offer a remedy for the conditions covered in points 2 to 5, inclusive.

I am informed that the accredited plan for the gradual eradication of bovine tuberculosis promises to be as successful as was the similar plan for the eradication of tick fever. I am glad that Dr. Kiernan, who had so much experience in tick eradication, is lending his experience to the tuberculosis eradication plan.

Dr. L. E. Day informed me that in October, 1921, there were in the United States 10,572 accredited herds and in them there were 243,365 cattle; that, in addition, there were 936,858 cows about ready to be accredited; that the total number of cows tested for tuberculosis one or more times under this plan was 1,677,254, out of a total of twenty-seven million dairy cows in the United States; that there are 27,963 other herds on the waiting list; that 3,703 herds in Iowa and 4,039 herds in Minnesota have been tested.

I do not think that the growth of pasteurization since 1908 has been much more rapid, if any, than has its twin remedy for the protection of the public health, tuberculin testing, since Dyson introduced the herd accredited plan in 1912.

HOG CHOLERA [1]

By R. C. REED
University of Maryland, College Park, Md.

SINCE the losses from hog cholera in the United States are greater than all other losses in the hog industry, it does not seem out of place to discuss at this time some of the methods used for the control and eradication of this disease.

Much has been done to systematize methods, but more or less confusion still exists and the losses continue to mount up, in spite of the fact that many people believe that these losses have been reduced almost or quite to a minimum. Estimates made by the United States Department of Agriculture, from the best data available, place the actual loss of hogs from hog cholera, in the United States, at $62,000,000. To this sum must be added the cost of serum, professional services for its administration, cleaning and disinfection, as well as the amounts spent by the Federal and State Governments in the systematic attempt to control the disease. This amount would be hard to reduce to figures, but probably is not less than $20,000,000, and the amount may run far beyond this figure. This sum seems too great to charge against this industry anunally, if our methods can in any way be improved. Year after year the fight continues, and we believe will continue, until the livestock owners and sanitarians can agree to employ the necessary measures not only to stop the spread of the infection but to destroy the virus. The methods too commonly employed tend to protect the individual owner temporarily without destroying the infection or preventing the spread of the disease to other herds.

Only by the prompt application of sanitary measures rigidly enforced can this spread be effectively checked. Sanitation does not mean simply cleaning and disinfection, both of which are absolutely essential, but also includes the use of all measures that can be applied for the promotion of health and the prevention of infection. Anything that keeps the animal up to the proper standard of vitality increases his resisting power to disease. Anything which tends to prevent the spread of the virus or the

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

harboring of it on premises will reduce the spread of the disease. Needless to state, if we can destroy the virus we have solved the whole hog-cholera problem. The question, therefore, for us to discuss is how best to destroy this infectious organism. All attention has been given to control and not to eradication.

For over four years we have followed rather closely in Maryland a definite plan for the control and eventual eradication of hog cholera. Apparently our efforts have not been in vain. Up to this time our greatest results seem to be in confining the disease to the original center after the outbreak has been reported to us. It is interesting to state in passing that according to the statistics given out by the United States Department of Agriculture, Maryland ranks ninth in density of hog population per square mile in the United States. In per cent of loss from hog cholera per square mile she stands twenty-fifth.

In attempting to outline the Maryland plan for the eradication of hog cholera I can not do better than to quote more or less freely from an article published in one of the farm journals some time ago. Our work was started with an intensive educational campaign in every county in the State. This enlisted the interest and the hearty support of a majority of farmers and hog raisers in the work which we were attempting to do.

THE MARYLAND PLAN

"The Maryland Plan," briefly outlined, consists of three cardinal points, as follows:

1. Proper precautions to prevent the introduction and spread of the infection.

2. To prevent the maintenance of centers of infection by cleaning and disinfection.

3. The minimizing of losses and shortening of the duration of the disease in sick or exposed herds by vaccination.

A careful analysis of these three points will impress one with the fact that the problem which is of vital importance is the prevention of primary centers of infection or new outbreaks, for if primary centers are not established the various agencies known to be responsible for the spread of the virus can not disseminate it. A widespread outbreak, therefore, would be impossible. On the other hand, by whatever method the new

center of infection is established, the danger of the spread of the disease is the same.

Experience has shown that there are three principal ways by which hog cholera is introduced into free localities, viz.: (1) Garbage feeding; (2) introduction of new stock, especially stocker hogs; (3) abuse of the double treatment. Undoubtedly these practices are responsible for more than 95 per cent of new outbreaks.

Garbage Feeding

Garbage feeding will be first considered, because in Maryland it appears to be responsible for more primary outbreaks than all other conditions. Of the primary outbreaks in the State during the year 1919, where it was possible to trace the source of infection, it was found that approximately 62 per cent of them were caused by the feeding of garbage. Canada considers it responsible for more than nine-tenths of their outbreaks.

The practice of feeding garbage was greatly stimulated by the abnormal prices for feed and pork incidental to the war. Officials encouraged its use as a food conservation measure, undoubtedly with the best intentions, but without foreseeing all the consequent danger. The desired results may or may not have been obtained. However, the time is past when the raising or feeding of hogs should be attempted under the conditions which impose an unnecessary risk of starting or maintaining centers of hog-cholera infection. This is especially true if it is expected to make hog raising safe from the ravages of hog cholera and the expense incidental thereto.

No attempt will be made at an exhaustive discussion of the merits of garbage disposal by reduction plants or by feeding to hogs. We have not been able to find data which show, from the standpoint of the taxpayer, the consumer or the feeder, that disposal of garbage by feeding to hogs has anything to recommend it over reduction. It is one of the surest methods of introducing hog-cholera infection. Uncooked garbage, as admitted by garbage feeding advocates, may contain the virus of hog cholera at any time.

It is believed that if the small gains usually obtained by feeding garbage were generally appreciated, few would bother with it, even though there were no danger from its use. It has been stated on good authority that, theoretically, under the best

conditions, one pound of pork may be obtained from 50 pounds of garbage. Practically, however, the ratio has been found to be nearer 70 to 80 pounds of garbage to one pound of pork. With pork selling at 14 cents a pound, and approximately 25 pounds being obtained from a ton of garbage, the value of the garbage would be about $3.50 a ton. Now that the price of pork is materially lower, the feeding value of a ton of garbage is still further reduced.

The feeding of this product in certain sections of the country is largely responsible for the hog-cholera outbreaks. It may therefore be seen that garbage feeding has no advantage for the hog raiser or the feeder. Further, it is without doubt absolutely incompatible with sanitation.

Claims are often made that the double treatment can be administered to swine and these animals be safely fed garbage. For the sake of argument we will admit this claim, although reports received indicate it has never been possible to prevent unsatisfactory losses of hogs in garbage feeding plants. Even if the claim be true and none of the hogs should "break," it is nevertheless evident that if unsterilized garbage is constantly brought to the premises it would mean the maintenance of constantly infected premises.

It is obvious that no person or persons should be permitted to maintain a garbage-feeding plant in an agricultural community. Neither should it be permitted in any locality unless the necessary precautions are taken to prevent the premises from harboring hog-cholera infection.

NEW STOCK

In the primary infections which have occurred in Maryland during the last 18 months, and in which we have been able to trace the source, it has been found that about 30 per cent are due to the introduction of new stock. By this method susceptible swine which have been exposed to the infection, but have not yet developed the disease, as well as animals already infected and those from infected premises, are all capable of transmitting virus.

It appears inconceivable that any person would knowingly sell, for breeding or stocker purposes, hogs that had been exposed to or had developed cholera. At a public sale in the

spring of 1919 hogs were sold that carried infection to fourteen premises. There are also many who make a practice when sickness occurs among their hogs of shipping the small pigs to dealers with the idea that they will be resold before evidence of the disease appears. They either do not care or fail to realize that such action may cause a loss of thousands of dollars. Two years ago on a single farm in one county nearly 200 hogs were lost because of the purchase of such stock.

Hogs from infected premises, although they themselves may have been immunized, have been known to carry infection to free premises. But if the farmers or stock raisers purchasing hogs from outside of Maryland comply with the State regulations, there should be but little danger of cholera from this source. The State regulations are framed with the idea of giving the best possible protection. They are as follows:

All swine brought into this Statte for feeding, breeding or show purposes must be accompanied by a certificate of health issued by a veterinarian whose competency and reliability are attested by the authorities charged with the control of domestic animals in the State of export, stating that they are free from any symptoms of infectious or communicable diseases, and that such animals have been treated with proper doses of anti-hog-cholera serum within thirty (30) days of the date of entry into Maryland.

Swine that have received the simultaneous treatment must not be brought into Maryland for purposes other than immediate slaughter until a period of at least thirty (30) days has elapsed since the date of treatment. Such animals must be given an antiseptic bath as provided for in paragraph 9 of this regulation, and not again exposed to infection before being shipped.

These regulations should also govern the action of buyers when purchasing hogs within the State unless the animals are known to come from free territory. Hogs bought in a locality as to which the purchaser does not have full knowledge should be isolated for at least 30 days. If by that time they do not exhibit evidence of disease they may be safely placed with the other hogs on the premises after having been given an antiseptic bath.

For the past three years the two above described sources of infection have been responsible for practically all of the new outbreaks of hog cholera within the State of Maryland. Therefore we believe that if close supervision of the double treatment is continued, and the farmers and stock raisers will cooperate with the livestock sanitary authorities in preventing the intro-

duction of infection through these two sources, there will be but little danger from hog cholera.

ABUSE OF THE DOUBLE TREATMENT

Unmerited criticism has been directed at the Maryland State Board of Agriculture because it is alleged that this Board is committed to a "single treatment" policy. The fact is, however, that the Board has never adopted such a policy, although actual experience has demonstrated to the livestock sanitary officials that in most instances the single treatment is all that is needed.

The Maryland authorities are neither bound by the single-treatment policy, nor are they opposing the proper use of the double treatment. It is not the use but the *abuse* of the double treatment which is of great concern to this Board, and to that it is unalterably opposed. Anyone familiar with the double treatment does not question its merits as an immunizing agent. On the contrary, anyone equally familiar with it knows that by its abuse more harm than good will result.

The abuse of the double treatment is (*a*) its use in free territory; (*b*) its use in sick herds without proper diagnosis; (*c*) its administration by incompetent persons; (*d*) its administration without every precaution being taken to prevent the spread of the infection in case any of the animals should "break," and (*e*) where, by its use, centers of infection might be established.

(*a*) Double treatment enthusiasts and those opposed to its promiscuous use are practically agreed on one point; that is, the inadvisability of administering serum and virus to swine in free territories. All persons conversant with the double treatment know that many so-called "unexplainable breaks" will occur. Therefore it may be seen that if hogs in a free area are given the double treatment, and if any of them should "break," the infection would be introduced into a territory where it was previously unknown. In certain cases an exception might be made for the breeder of purebred hogs, whose lots are always open to visitors, and whose swine are exhibited at fairs. But such persons are usually so situated that they can completely isolate their stock; however, precautions must be taken to prevent speading the disease or maintaining centers of infection.

(*b*) The administration of serum and virus to swine in sick

herds, if the condition be something other than cholera, is practically certain to produce an outbreak of the disease. Many times swine suffering from digestive trouble where diarrhea is present are thought to have cholera and are given the simultaneous treatment. As a result losses occur and the serum is usually blamed. Swine affected with any disease other than hog cholera, or which have been denied proper feed and care, have their vitality so lowered that they are less resistant to the virus and they are more certain to "break" than if they were healthy.

Many times double-treatment advocates appear to be of the opinion that there is no danger in giving the serum and virus to a sick herd. They argue that as hog cholera is present there is no danger of introducing an infection that is not already on the premises. This might be true if the sickness were hog cholera, but it would be a serious mistake if the condition proved to be something else.

To administer the double treatment to a sick herd before a positive diagnosis has been made (and a positive diagnosis can only be determined by a postmortem examination) is an abuse of this treatment. It may not only start a new center of infection but cause unnecessary losses, and it also has a tendency to make the farmers and stock raisers hesitate to employ vaccination when its use is really indicated.

(*c*) Determining just what constitutes competency in the administration of the double treatment might lead to endless discussion. If it only concerned the injection of the serum and virus it would be an easy problem to solve, as this procedure may be taught to any careful person in the course of a few minutes. The problems surrounding its administration are so varied and complex that an individual to be competent must fully understand the products which he is using. He should be able to determine when the treatment should or should not be administered. He should be capable of making a proper diagnosis and be able to determine whether or not the swine are in condition to receive the treatment. He must also be experienced in estimating weight of hogs and in determining dosage.

(*d*) All possible precaution should be taken to prevent the spread of the infection in case animals "break" as a result of the administration of the double treatment. If it were possible

to administer this treatment so that there would be no "breaks" it would be unnecessary to use so many precautions to prevent the spread of the infection. But it is impossible to determine, at the time of injection, whether or not any of the animals will develop hog cholera as a result of the treatment.

The claims of the double treatment advocates to the effect that the number of animals in a herd which develop the disease as a result of the treatment is usually very small may generally be accepted. However, at times the losses are most discouraging. But if only one animal in the herd "breaks" as a result of the treatment, a center of hog-cholera infection is established just as surely as if the disease had been contracted in some other manner. Further, it is just as possible for the infection to be carried from the premises as it would be if the whole herd had developed the disease.

A short time ago a herd of purebred swine in this State was given the double treatment. As a result of the treatment one of the animals developed hog cholera. After the serum and virus had been administered, but before this hog "broke" with the disease, a number of sows farrowed, and they with their young pigs were put in pens adjoining the double-treated hogs. The infection spread to these young pigs and there was a discouraging and unnecessary loss as a result of this negligence.

(*e*) The maintenance of infected premises by the use of the double treatment. It is not generally appreciated that infected premises may be as much or even more of a menace than sick herds. However, experience has proved this to be a fact in many instances. Numerous outbreaks have occurred which were caused directly or indirectly by infected premises. When there are sick hogs on a given place, the neighbors will ordinarily use more or less care to prevent the spread of the infection. After the animals have all died or recovered, as the case may be, these same neighbors are apt to forget that the infection may still be harbored on the premises. From here it may be spread and start new outbreaks on other farms and may also infect hogs bought to replace those on the first farm.

A careful analysis of the subject shows that apparently one of the greatest dangers arising from the use of the double treatment is that it causes a feeling of security and creates a tendency to discourage cleaning and disinfection.

The regulations of the State Board of Agriculture governing the use of the double treatment prescribe that if it is desired to administer this treatment the swine owner shall make application to the Livestock Sanitary Section of the Board for a permit to use it. By signing this application the owner agrees to have the treatment administered by a registered graduate veterinarian (giving the name of the veterinarian),. that the animals under treatment shall be isolated for at least thirty days, at the end of which time that portion of the premises on which the hogs were confined shall be cleaned and disinfected and the animals dipped in an approved disinfecting solution.

Experience has proved that in Maryland there are two main causes for the spread of hog-cholera infection in case an outbreak is started in a neighborhood. They are, first, failure to give warning of the outbreak; second, failure on the part of the owner to dispose promptly and properly of the carcasses of hogs that die.

One of the reasons why people do not give warning when their hogs are suffering from cholera is that they feel it is a disgrace and therefore try to conceal the fact. If they would only look at it in the proper light they could easily see that the real disgrace is in not reporting it. If a person's hogs have cholera would it be a disgrace for him to notify the authorities and neighbors so that they might take the proper steps to prevent the spread of the infection? Does not the disgrace lie in trying to conceal the matter? Because of lack of this information neighbors and others do not take the proper precaution, and the infection is carried to their hogs, causing unnecessary loss.

In order to prevent the spread of infection, all illness among swine should be considered hog cholera until proven otherwise. This will entail practically no extra expense. Then should the infection prove to be hog cholera, there will be slight danger of its spread. On the other hand should the disease prove to be something other than cholera, the self-imposed quarantine will have caused no material hardship.

One of the greatest dangers of the spread of hog-cholera infection from the primary outbreak is the failure to dispose promptly and properly of the carcasses of hogs that have died of the disease. In fact, it is believed that in the past this has

been responsible for more secondary outbreaks than all other conditions combined. The Maryland law, as quoted below, is most explicit. Farmers and stock raisers will give great protection not only to their own animals but to the swine industry at large by its strict observance.

> All hogs and other domestic animals dying of contagious or infectious disease shall be buried at a depth of at least three (3) feet, or be burned, at the discretion of the owner. And any person or persons permitting any dead hogs or any other domestic animal, having died of any contagious disease, to remain unburied upon his or her premises for the space of three hours prior to sunset of said day after he has discovered same, shall be guilty of a misdemeanor, and upon conviction thereof before any justice of the peace shall be fined not less than ten ($10.00) dollars for each offense or imprisoned in the county jail for not less than ten (10) days, or be both fined and imprisoned in the discretion of the justice.

In many instances careless and indifferent persons, in absolute disregard of the safety of their neighbors' stock, have neglected to comply with this law. They take advantage of the fact that it specifies that only animals dying of contagious or infectious diseases should be so disposed of. They either profess ignorance as to the cause of the death of their hogs or ascribe it to some condition other than a contagious or infectious disease. To stop such evasion of the law, the State Board of Agriculture adopted the following regulation, which makes it imperative that carcasses of all animals having died of any cause must be properly disposed of:

> As the practice of allowing dead animals to remain unburied is a menace to the health of the livestock of the community, and frequent cause of disease, it is hereby required that horses, asses, cattle, swine or other domestic animals, having died from any cause, be burned or buried at a depth of at least three feet, or sent to some establishment where dead animals are disposed of in a manner to prevent their becoming a menace.

Too much emphasis can not be put upon the fact that it is absolutely essential for farmers and stock raisers to assist the authorities in seeing that these requirements are complied with. Prompt notice with confirming evidence of violation of these regulations should be given the livestock sanitary officials.

It is incumbent upon the owner of a sick herd to take the necessary precautions to prevent the spread of the infection from his premises. Equal responsibility, however, rests on the owner of the hogs which have not been exposed to the infection. The owner of the sick herd might comply with every

regulation to prevent the spread of infection, yet people with well herds could undo much of his good work by carelessness.

There is no doubt that the danger of infected premises is much underestimated. Data gathered from the work in Maryland show these conditions to have been responsible for many outbreaks of hog cholera. Just what constitutes cleaning and disinfection of premises seems to be misunderstood by many farmers and stock raisers. They appear to dread the task and in a large per cent of instances they prefer to adopt the more expensive method of immunization. They forget that by this procedure they are perpetuating a menace for their swine, when by proper cleaning and disinfection they would remove this and in addition would undoubtedly improve the condition of their hogs.

We do not question the value of the serum treatment, or even the serum-virus treatment when properly applied, in the minimizing of losses, shortening of the duration of the disease in sick or exposed herds; but too much dependence has often been put upon the serum treatment, which is not, and never has been, advocated as a cure.

Our work in Maryland has been carried on entirely in cooperation with the Division of Hog Cholera Control of the United States Bureau of Animal Industry, and our results have been satisfactory when compared with the methods employed in other States. The cost has been nominal.

In each case reported to us we attempt first of all to make a definite diagnosis, and if the disease proves to be hog cholera measures are taken to stop the spread of the disease by a voluntary quarantine and by notifying neighbors and giving them definite instruction regarding the prevention and control of hog cholera. One of the greatest drawbacks to our work is the late reporting of outbreaks. If information of the sickness reaches us promptly the number of secondary outbreaks is reduced to a minimum.

Finally, the "Maryland Plan," when boiled down, is the prevention of the introduction, harboring and spread of the hog-cholera virus.

BOTULISM IN ITS RELATION TO ANTI-HOG-CHOLERA SERUM AND HOG-CHOLERA VIRUS

By EDW. A. CAHILL, H. W. JAKEMAN *and* T. W. MUNCE

Indianapolis, Indiana

THE SUBJECT of botulism in swine has until recently been limited to an occasional reference to the isolation of *Bacillus botulinus* from that species, usually from the feces. More recently Graham (1) reported the presence of *B. botulinus* Type A in the tissues of a number of swine and described sporadic and enzootic conditions which he called botulism. Graham's work was inaugurated on account of increased losses in swine both previous and subsequent to hog-cholera immunization. Several conclusions offered by him regarding the present status of swine diseases differ radically from the findings of other investigators and are as yet unsupported by published data. Of special interest are two points raised by Graham. The first is that there exists in swine a previously unrecognized disease—botulism—while the second is that a large percentage of commercial anti-hog-cholera serum and hog-cholera virus is contaminated with *B. botulinus*. This latter assertion is of particular interest, since hog cholera is the most serious disease of swine and the products named are the only two which are capable of immunizing animals against that disease.

The use of these products in the immunization of swine against cholera and public confidence in their efficacy are responsible for materially reducing both the number of susceptible animals and the losses from the disease. Loss of confidence in products capable of producing such immunity would naturally result in the immunization of fewer animals, which would cause an increase both in the number of susceptible swine and the losses from disease. Conversely, if it were proven that these products may be contaminated, either with *B. botulinus* or with its toxin, this would constitute a menace equally as great, since there would then be presented the possibility of one disease being caused by products intended for the prevention of another. Since the public is vitally concerned in the results following the use of these products, and since erroneous conclu-

sions may cause irreparable damage, there are required confirmed data and experiments rather than an expression of opinion.

With these points in mind the writers have undertaken to appraise the correctness of Graham's conclusions. Points for consideration have been taken up in the order of their practical importance.

The first experiment was conducted with four samples of anti-hog-cholera serum and one sample of virus. These were samples of serial lots (although different bottles) which had been examined by Graham (1) and included in the 16 per cent which he found contaminated. All were examined for the presence of botulinus toxin as described in Table 1. The completely negative results are particularly striking when it is realized that large amounts of supposedly toxic material were used.

Each sample of serum was next submitted to cultural and additional toxicity tests, with negative results, as shown in Table 2. When these cultures were injected into mice and guinea-pigs there was no evidence of toxin production. Samples of the material under test had been submitted to two recognized authorities on botulism, and their findings were in exact conformity with those given in Table 1 and Table 2.

Since there now remained only a small quantity of each lot of serum being tested, these were mixed and the composite sample tested for its toxicity for swine, as shown in Table 3. Botulinus antitoxin was used on two pigs to compare animals so treated with those which were expected to sicken as a result of receiving supposedly toxic material. Pig No. 9242, apparently affected with cholera, died on the tenth day after inoculation. The possibility of botulism in this animal is precluded by the fact that it had received 1,500 units of botulinus antitoxin (Type A).

During the past three years the writers have conducted and observed over 1,700 tests to determine the possible presence of toxin in anti-hog-cholera serum and hog-cholera virus. Each test represented a serial lot of serum or virus and was conducted by inoculating guinea-pigs and mice with 3 c.c. and 0.5 c.c. respectively of the product under test. Nothwithstanding the

TABLE 1.—TOXICITY TEST OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.

Animal	No.	Material Injected[1]	Method of Injection[1]	Amount Injected (c.c.)	Observations						Remarks
					42 Hours	48 Hours	72 Hours	96 Hours	120 Hours	7 Days	
Guinea-Pig	4016	Sim.virus A	S. C.	3	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	
Do	4017	do.	do.	3	do.	do.	do.	do.	do.	do.	
Do	4018	do.	do.	3	do.	do.	do.	do.	do.	do.	
Do	4019				do.	do.	do.	do.	do.	do.	Cage control.
White Mouse	4020	Sim.virus A	I.P.	0.5	do.	do.	do.	do.	do.	do.	
Do	4021	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	4022	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	4023	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	4024				do.	do.	do.	do.	do.	do.	Cage control.
Do	4025				do.	do.	do.	do.	do.	do.	do
Guinea-pig	3798	H.C.S. A	S.C.	3	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	
Do	3799	do.	do.	3	do.	do.	do.	do.	do.	do.	
Do	3800				do.	do.	do.	do.	do.	do.	Cage control.
White Mouse	3801	H.C.S. A	I.P.	0.5	do.	do.	do.	do.	do.	do.	
Do	3802	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3803	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3804				do.	do.	do.	do.	do.	do.	Cage control.
Do	3805				do.	do.	do.	do.	do.	do.	do.
Guinea-pig	3806	H.C.S. B	S.C.	3	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	
Do	3807	do.	do.	3	do.	do.	do.	do.	do.	do.	
Do	3808				do.	do.	do.	do.	do.	do.	Cage control.
White mouse	3809	H.C.S. B.	I.P.	0.5	do.	do.	do.	do.	do.	do.	
Do	3810	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3811	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3812				do.	do.	do.	do.	do.	do.	Cage control.
Do	3813				do.	do.	do.	do.	do.	do.	do.
Guinea-pig	3814	H.C.S. C.	S.C.	3	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	
Do	3815	do.	do.	3	do.	do.	do.	do.	do.	do.	
Do	3816				do.	do.	do.	do.	do.	do.	Cage control.
White mouse	3817	H.C.S. C.	I.P.	0.5	do.	do.	do.	do.	do.	do.	
Do	3818	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3819	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3820				do.	do.	do.	do.	do.	do.	Cage control.
Do	3821				do.	do.	do.	do.	do.	do.	do.
Guinea-pig	3822	H.C.S. D.	S.C.	3	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	
Do	3823	do.	do.	3	do.	Dead					Autopsy, septicemia.
Do	3824				do.	O.K.	O.K.	O.K.	O.K.	O.K.	Cage control.
White mouse	3825	H.C.S. D.	I.P.	0.5	do.	do.	do.	do.	do.	do.	
Do	3826	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3827	do.	do.	0.5	do.	do.	do.	do.	do.	do.	
Do	3828				do.	do.	do.	do.	do.	do.	Cage control.
Do	3843				do.	do.	do.	do.	do.	do.	Cage control.

[1]Key to abbreviations: "Sim.," simultaneous; "H.C.S.," hog-cholera serum; "S.C.," subcutaneous; "I.P.," intraperitoneal.

TABLE 2.—BACTERIOLOGICAL EXAMINATION OF ANTI-HOG-CHOLERA SERUM FOR BACILLUS BOTULINUS.

Material, serum from original unopened containers. Injection of guinea-pigs with 0.3 c.c. 2 weeks old cultures, subcutaneously, one guinea-pig to each culture.

Anti-Hog-Cholera Serum	Guinea-pig Inoculations	Aerobic Growth on Agar	Anaerobic Growth			Glucose Broth	Glucose Broth, Duplicate	Meat Medium	Meat Medium, Duplicate
			Glucose Bouillon	Glucose Agar	Meat Medium				
Sample A.									
Bottle 1	O.K., 120 hours	–	–	–	–	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours
Bottle 2	do.	–	–	–	–	do.	do.	do.	do.
Sample B.									
Bottle 1	O.K., 120 hours	–	–	–	–	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours
Bottle 2	do	+	–	–	–	do.	do.	do.	do.
Sample C.									
Bottle 1	O.K., 120 hours	–	–	–	–	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours
Bottle 2	do.	–	–	–	–	do.	do.	do.	do.
Sample D.									
Bottle 1	O.K., 120 hours	–	–	–	–	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours	O.K., 120 hours
Bottle 2	do.	–	–	–	–	do.	do.	do.	do.

TABLE 3.—TESTS OF COMPOSITE SAMPLE OF HOG-CHOLERA SERUM FOR TOXICITY FOR SWINE.

Date Inoculated	Tag No.	Weight (Pounds)	Serum Injected (c.c.)[1]	Amount of Botulinus (Type A) Antitoxin (Units)	Amount of Virus (c.c.)[2]	Temperature Day Inoculated	Observations and temperatures.[3] November—																						
							6[4]	7	8	9	10	11	12	13[4]	14	15	16	17	18	19[2]	20[4]	21	22	23	24[5]	25	26
1921																													
Nov. 5	9216	100	35		3	101.0	...	2.0	2.4	3.0	3.2	4.0	3.6	...	2.6	1.6	1.0	1.6	1.6	2.0	...	2.0	1.0	2.0	...	1.2	1.4
							...	X	X	X	X	X	X	...	X	X	X	X	X	X	...	X	X	X	...	X	X
Do	9220	100	35		3	102.2	...	1.6	2.8	2.6	2.0	2.8	3.0	...	2.0	2.0	3.0	3.0	2.4	1.6	...	1.4	2.6	2.2	...	2.0	1.0
							...	X	X	X	X	X	X	...	X	X	X	X	X	X	...	X	X	X	...	X	X
Do	9236	105	35		3	101.2	...	2.6	2.4	4.0	4.4	3.6	4.0	...	2.6	2.0	2.0	2.0	2.0	2.4	...	2.4	3.0	2.0	...	1.0	2.0
							...	X	X	X	X	X	X	...	X	X	X	X	X	X	...	X	X	X	...	X	X
Do	9240	95	35	1,500	3	101.4	...	2.6	2.0	2.0	6.0	3.0	4.2	...	2.2	2.6	1.0	2.0	2.0	1.8	...	2.0	2.0	1.8	...	1.6	2.0
							...	X	X	X	X	X	X	...	X	X	X	X	X	X	...	X	X	X	...	X	X
Do	9242	98	35	1,500	3	102.0	...	2.4	3.8	6.0	6.0	6.2	4.8	...															
							...	X	X	...	...	S	S	...	S	(6)													

[1]Composite sample of hog-cholera serums A, B, C and D.
[2]The virulence of the virus used was established by inoculation of several hundreds of virus pigs.
[3]Temperature shown in first line in each case; figures for hundred omitted (e. g., 2.0 = 102.0). Condition shown in second line in each case, X = healthy; S = visibly sick.
[4]Sunday. [5]Holiday. [6]Died Nov. 15; lesions of cholera.

large amount of injected material, the findings have never indicated the presence of toxin. These tests have been conducted at a time sufficiently long after production to allow for the detection of botulinus toxin if present. Notwithstanding this it was felt, in view of Graham's statement (1) that more than 16 per cent of commercial anti-hog-cholera serum and hog-cholera virus "is contaminated with toxigenic strains" of *B. botulinus*, that a large number of aged samples should be re-examined both culturally and for toxicity.

Bengston (2), Orr (3) and others have shown that 0.0001 c.c. of botulinus toxin is a lethal dose for a 250-gram guinea-pig. Orr (4) has shown that mice are extremely susceptible to the same dose, while if this be increased to 0.1 c.c. death occurs in approximately four hours. It was, therefore, felt that an intraperitoneal injection of 0.5 c.c. would be an overwhelming dose if toxin were present in the products under test. One hundred and twenty-five serial lots of anti-hog-cholera serum and nine serial lots of virus were tested in this manner. The results were entirely negative, as shown in Table 4. White mice were used in inoculating the serum and guinea-pigs were used in the case of the virus. All mice were injected intraperitoneally with 0.5 c.c. and all guinea-pigs subcutaneously with 3 c.c. of the phenolized commercial product. Since the oldest samples in the test had been produced two years and ten days and the freshest five months previously, it was felt that the material should be quite toxic if toxigenic strains of *B. botulinus* were present. Mice inoculated with samples 3 and 42 died from causes other than the material injected. The table shows a repetition of the tests on these lots with satisfactory results.

Although these results strongly indicated the absence of botulinus toxin in the material under test, it was felt advisable that the investigations be carried further. Accordingly these same serial lots were then tested by planting 10 c.c. of each sample in 50 c.c. of medium known to be particularly favorable to toxin production. The medium used consisted of equal parts of minced beef and water which was definitely alkaline (pH 8.0). This is a modification of the Muriel Robertson (5) medium and has proven most valuable for the production of

botulinus and other toxins. The cultures were observed on the second, fourth, seventh and seventeenth days for gas formation and the odor ordinarily associated with *B. botulinus*. Particular attention was given to the examination for odor both in the newly opened bottle used for planting and inoculating and in the periodic cultural examinations. DeBord (6) states that all material examined by the United States Bureau of Chemistry and found to contain *B. botulinus* or its toxin had a distinctly offensive characteristic odor. Practically all investigators refer to the disagreeable, rancid odor possessed by material in which *B. botulinus* is growing, and no data were available to indicate that anti-hog-cholera serum or virus would be exceptions to this general rule. After seventeen days, white mice were inoculated with these cultures, using 0.3 c.c. of each sample subcutaneously. An accident in one of the cages was responsible for the death of several animals. In these cases the samples were reinoculated with satisfactory results. The results are tabulated in Table 4.

Since the experiments outlined in Table 4 indicate the absence of *B. botulinus* and its toxin in samples representing over 12,000,000 c.c. of anti-hog-cholera serum and nearly 200,000 c.c. of virus, it would seem that the possibility of botulism being caused by these products is remote.

Elder and Pischel (7), Burke (8), Dickson (9) and many others have shown that *B. botulinus* or its spores are incapable of causing botulism when ingested or otherwise gaining entrance to the body unless associated with preformed toxin. These observers believe the organism to be a saprophyte incapable of causing disease unless its toxin is formed outside the body. Thom, Edmondson and Giltner (10) and more recently Orr (11) have shown that, when massive quantities of spores are administered to guinea-pigs subcutaneuously or per os, botulism may develop. Although the exact status of this problem remains unsettled, it was deemed advisable to determine whether or not anti-hog-cholera serum or virus artificially contaminated with *B. botulinus* would contain a preformed toxin capable of causing botulism, or whether swine inoculated with a spore-serum mixture would develop botulism as occurred in Orr's experiments with guinea-pigs. To determine this point spores were prepared

TABLE 4.—INOCULATION TESTS OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.—*Continued.*

Animal Inoculations with Hog-Cholera Serum and Virus.[1]			Anaerobic Growth on meat medium		Animal Inoculations with 0.3 c.c. 17-day-old meat medium cultures, subcutaneously		Reinoculations	
Material	Animal[2]	Results	Gas	Rancid Odor	Animal[2]	Results	Animal[2]	Results
Serum 1	WM 3912	O.K., 120 hours	−	−	WM 4282	O.K., 72 hours		
2	3931	do.	−	−	4308	do.		
3	3914	Dead, 96 hours[3]	−	−	4348	do.		
4	3915	O.K., 120 hours	−	−	4301	do.		
5	3916	do.	−	−	4343	do.		
6	3917	do.	+	−	4354	do		
7	3918	do.	−	−	4272	do.		
8	3919	do.	−	−	4358	Dead, 48 hours	WM 4407	O.K., 72 hours
9	3920	do.	−	−	4263	O.K., 72 hours		
10	3921	do.	−	−	4350	do.		
11	3922	do.	−	−	4332	do.		
12	3923	do.	−	−	4285	do.		
13	3924	do.	−	−	4286	do.		
14	3925	do.	−	−	4257	do.		
15	3926	do.	−	−	4276	do.		
16	3927	do.	−	−	4309	Dead, 48 hours	WM 4432	O.K., 72 hours
17	3928	do.	−	−	4306	O.K., 72 hours		
18	3929	do.	−	−	4339	do.		
19	3930	do.	−	−	4264	do.		
20	3931	do.	−	−	4389	do.		
21	3932	do.	−	−	4361	do.		
22	3933	do.	−	+	4328	do.		
23	3934	do.	−	−	4277	do.		
24	3935	do.	−	−	4376	Dead, 24 hours	WM 4404	O.K., 72 hours
25	3936	do.	−	−	4312	do.	WM 4426	do.
26	3937	do.	−	−	4213	O.K., 72 hours		
27	3938	do.	−	−	4380	do.		
28	3939	do.	−	−	4335	do.		
29	3940	do.	−	−	4258	do.		
30	3941	do.	−	−	4371	do.		
31	3942	do.	−	−	4274	Dead, 24 hours	WM 4410	O.K., 72 hours
32	3943	do.	−	−	4386	do.	WM 4428	do.
33	3944	do.	−	−	4265	O.K., 72 hours		
34	3945	do.	−	−	4372	Dead, 12 hours	WM 4401	O.K., 72 hours
35	3946	do.	−	−	4374	O.K., 72 hours		
36	3947	do.	−	−	4321	Dead, 24 hours	WM 4400	O.K., 72 hours
37	3948	do.	−	−	4363	do.	WM 4430	do.
38	3850	do.	−	−	4392	O.K., 72 hours		
39	3950	do.	−	−	4388	do.		
40	3951	do.	−	−	4296	do.		
41	1840	do.	−	−	4303	do.		
42	3953	Dead, 48 hours[3]	−	−	4290	do.		
43	3954	O.K., 120 hours	−	−	4298	Dead, 48 hours	WM 4408	O.K., 72 hours
44	3955	do.	−	−	4295	O.K., 72 hours		
45	3956	do.	−	−	4341	do.		
46	3957	do.	−	−	4271	do.		
47	3958	do.	−	−	4326	do.		

TABLE 4.—INOCULATION TESTS OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.—*Continued.*

	Animal Inoculations with Hog-Cholera Serum and Virus.[1]				Animal Inoculations with 0.3 c.c. 17-day-old meat medium cultures, subcutaneously		Reinoculations	
	Material	Animal[2]	Results	Anaerobic Growth on meat medium: Gas	Anaerobic Growth on meat medium: Rancid Odor	Animal[3]	Results	Animal[3]	Results
48		3959	do.	−	−	4283	do.		
49		1841	do.	−	−	4337	do.		
50		3961	do.	−	−	4385	do.		
51		3962	do.	+	−	4292	do.		
52		3963	do.	+	−	4366	do.		
53		3964	do.	−	−	4356	do.		
54		3965	do.	−	−	4365	do.		
55		3966	do.	−	−	4293	do.		
56		3967	do.	−	−	4262	do.		
57		3968	do.	−	−	4378	Dead, 48 hours	WM 4425	O.K., 72 hours
58		3969	do.	−	−	4314	O.K., 72 hours		
59		3970	do.	−	−	4383	do.		
60		3971	do.	−	−	4319	do.		
61		3972	do.	−	−	4342	do.		
62		3973	do.	−	−	4260	do.		
63		3974	do.	−	−	4387	do.		
64		3975	do.	−	−	4316	do.		
65		3976	do.	−	−	4288	do.		
66		3977	do.	−	−	4346	do.		
67		3978	do.	−	−	4352	do.		
68		3979	do.	−	−	4284	do.		
69		3987	do.	−	−	4266	Dead, 48 hours	WM 4420	O.K., 72 hours
70		3988	do.	−	−	4268	O.K., 72 hours		
71		9390	do.	−	−	4253	do.		
72		3993	do.	−	−	4267	do.		
73		3995	do.	−	−	4335	do.		
74		3996	do.	−	−	4336	Dead, 48 hours	WM 4402	O.K., 72 hours
75		3997	do.	−	−	4307	O.K., 72 hours		
76		3998	do.	−	−	4304	Dead, 24 hours	WM 4431	O.K., 72 hours
77		3999	do.	−	−	4359	Dead, 12 hours	WM 4403	do.
78		4004	do.	−	−	4287	O.K., 72 hours		
79		4005	do.	−	−	4299	do.		
80		4010	do.	−	−	4310	do.		
81		4011	do.	−	−	4329	Dead, 48 hours	WM 4437	O.K., 72 hours
82		4028	do.	−	−	4349	O.K., 72 hours		
83		4030	do.	−	−	4320	do.		
84		4032	do.	−	−	4382	do.		
85		4038	do.	−	−	4278	do.		
86		4040	do.	−	−	4338	do.		
87		4042	do.	−	−	4311	Dead, 48 hours	WM 4422	O.K., 72 hours
88		4046	do.	−	−	4334	O.K., 72 hours		
89		4048	do.	−	−	4375	do.		
90		4050	do.	−	−	4327	do.		
91		4052	do.	−	−	4344	Dead, 48 hours	WM 4321	O.K., 72 hours
92		4056	do.	−	−	4393	O.K., 72 hours		
93		4058	do.	−	−	4300	do.		
94		4060	do.	−	−	4279	do.		

TABLE 4.—INOCULATION TESTS OF HOG-CHOLERA SERUM AND VIRUS FOR BOTULINUS TOXIN.—*Continued.*

Animal Inoculations with Hog-Cholera Serum and Virus.[1]			Anaerobic Growth on meat medium		Animal Inoculations with 0.3 c.c. 17-day-old meat medium cultures, subcutaneously		Reinoculations	
Material	Animal[2]	Results	Gas	Rancid Odor	Animal[2]	Results	Animal[2]	Results
95	4062	do.	−	−	4373	do.		
96	4068	do.	−	−	4351	do.		
97	4070	do.	−	−	4390	do.		
98	4072	do.	−	−	4322	do.		
99	1775	do.	−	−	4317	do.		
100	1776	do.	−	−	4340	Dead, 24 hours	WM 4411	O.K., 72 hours
101	1777	do.	−	−	4370	O.K., 72 hours		
102	1778	do.	−	−	4367	Dead, 12 hours	WM 4440	O.K., 72 hours
103	1779	do.	−	−	4294	do.	WM 4294	do.
104	1780	do.	−	−	4281	Dead, 48 hours	WM 4399	do.
105	1781	do.	−	−	4291	O.K., 72 hours		
106	1782	do.	−	−	4250	do.		
107	1783	do.	−	−	4353	do.		
108	1811	do.	−	−	4357	do.		
109	1812	do.	−	−	4360	Dead, 48 hours	WM 4424	O.K., 72 hours
110	1813	do.	−	−	4280	O.K., 72 hours		
111	1814	do.	−	−	4345	do.		
112	1815	do.	−	−	4269	Dead, 48 hours	WM 4434	O.K., 72 hours
113	1816	do.	−	−	4330	O.K., 72 hours		
114	1817	do.	−	−	4302	do.		
115	1818	do.	−	−	4333	Dead, 48 hours	WM 4407	O.K., 72 hours
116	1819	do.	−	−	4391	O.K., 72 hours		
117	1820	do.	−	−	4289	do.		
118	1821	do.	−	−	4377	do.		
119	1822	do.	−	−	4379	do.		
120	1826	do.	−	−	4331	Dead, 48 hours	WM 4416	O.K., 72 hours
121	1827	do.	−	−	4364	O.K., 72 hours		
122	1828	do.	−	−	4347	Dead, 48 hours	WM 4427	O.K., 72 hours
123	1830	do.	−	−	4323	do.	WM 4408	do.
124	1831	do.	−	−	4381	O.K., 72 hours		
125	1839	do.	−	−	4720	do.		
3[4]	4066	do.						
42[4]	4015	do.						
Virus 1	GP. 4188	do.	−	−	WM 4384	O.K., 72 hours		
2	4189	do.	−	−	4313	do.		
3	4190	do.	−	−	4318	do.		
4	4191	do.	−	−	4368	do.		
5	4192	do.	−	−	4315	do.		
6	4196	do.	−	−	4355	do.		
7	4197	do.	+	−	4325	Dead, 48 hours	WM 4414	O.K., 72 hours
8	4198	do.	−	−	4362	O.K., 72 hours		
9	4199	do.	−	−	4275	do.		
Medium Control			−	−	4261	Dead, 48 hours	WM 4413	O.K. 72 hours

[1]For white mice, 0.5 c.c. intraperitoneally; for guinea-pigs, 3 c.c. subcutaneously.
[2]WM=white mice; GP=guinea-pig.
[3]See reinoculation of this sample near bottom of table.
[4]Reinoculation of sample after death of first animal.

by planting two toxigenic strains of *B. botulinus* (Type A) in glucose bouillon, and after seventeen days' contact the cultures were heated to destroy the toxin and guinea-pigs were inoculated.

As will be seen in Table 5 one guinea-pig died on the fifth and one on the sixth day, presumably as a result of toxin formed within the body. This is in accord with the recent work of Orr (11), since, if toxin were contained in the injected material, death would have followed in a few hours.

TABLE 5.—INOCULATIONS WITH HEATED BOTULINUS CULTURES.

Guinea-pig No.	Date Inoculated	Material	Results
4076	Nov. 25, 1921	1 c.c. of heated bouillon culture	Died, 5 days
4077	do.	do.	do.

The heated suspension was cultured in minced meat medium to make certain that the spores had not been destroyed. All cultures showed profuse growth of *B. botulinus* in two days. That the toxin-producing ability of the spores had not been destroyed was proven by animal inoculations shown in Table 6.

TABLE 6.—INOCULATIONS WITH BOTULINUS CULTURES FROM HEATED SUSPENSION.

Material	Date Heated and Cultured	Guinea-Pig No.	Date of Inoculation	Amount Inoculated	How Inoculated	Results
Bouillon cultures from heated suspension shown in Table 5	Nov. 25, 1921	4204	Dec. 21, 1921	0.2 c.c.	Subcutaneously	Dead, 5 hours
	do.	4205	do.	do.	do.	do.

Four bottles of phenolized anti-hog-cholera serum were inoculated with this toxin-free spore suspension which had been proven viable and toxigenic. Two bottles were inoculated with 0.1 c.c. and two with 0.5 c.c. of the spore suspension, and all were allowed to stand at room temperature for fifteen days, after which guinea-pigs were inoculated. All animals received 0.5 c.c. subcutaneously, two receiving 18 million spores and two 90 million, respectively, depending upon the bottles from which they were inoculated. The two which received 90 million died in six days, while those receiving 18 million died in seventeen days, which again indicates that toxin was formed within the body. These results, confirming as they do those which are

TABLE 7.—INOCULATION OF SWINE WITH MIXTURE OF ANTI-HOG-CHOLERA SERUM AND BOTULINUS SPORES.

(Each animal inoculated with 25 c.c. of the serum-spore mixture containing approximately 180 million spores per c.c., and with 2 c.c. of hog-cholera virus, the virulence of which was established by the inoculation of several hundred pigs for the production of hog-cholera virus.)

Pig No.	Weight (Pounds)	Temperature Day inoculated	Observations and Temperatures[1]																		
			1	2	3	4	5[2]	6[2]	7	8	9	10	11	12[2]	13[2]	14	15	16	17	18	19
2995	44	100.0	2.4	2.6	1.6	2.6	.....	.....	2.0	2.2	1.8	1.8	2.0	.....	.....	2.0	2.0	2.0	2.0	2.2	2.0
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2996	38	100.8	3.6	2.0	2.0	2.2	.....	.....	2.6	1.8	2.0	2.0	2.2	.....	.....	2.2	2.0	2.6	2.2	2.6	2.4
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2997	43	101.4	3.6	2.4	2.6	3.8	.....	.....	2.6	2.0	2.2	2.2	1.8	.....	.....	1.8	3.4	2.0	2.6	2.0	2.2
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2998	35	101.6	1.0	3.2	1.8	2.6	.....	.....	2.0	2.0	1.6	2.0	2.0	.....	.....	2.0	2.2	1.8	2.6	2.0	2.2
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
2999	28	100.4	2.6	3.0	2.6	3.0	.....	.....	1.8	2.0	2.0	2.0	2.2	.....	.....	2.0	2.4	2.0	2.2	2.4	2.4
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X
3000	38	101.8	3.2	2.0	2.6	2.6	.....	.....	2.0	1.6	2.0	2.2	2.4	.....	.....	2.6	2.6	2.4	2.0	2.6	2.0
			X	X	X	X	.....	.....	X	X	X	X	X	.....	.....	X	X	X	X	X	X

[1]Numerals in first row below heading indicate number of days after inoculation. Figures for hundred omitted from temperatures (e. g., 2.4=102.4). X=healthy.
[2]Sunday. [3]Holiday.

presented in Table 5, apparently indicate that botulinus toxin is not produced in phenolized anti-hog-cholera serum, since, had toxin been present, the guinea-pigs should have died a few hours subsequent to injection.

In view of these findings, which agree with those of Orr (11) and others that massive doses of spores may result in the death of guinea-pigs, it was deemed necessary to determine if similar results might occur in swine. Accordingly swine weighing less than 50 pounds were inoculated with 25 c.c. of this serum-spore mixture. All remained well, as shown in Table 7, although they received in the injection approximately four billion spores.

In order that the apparent conclusion might be substantiated by results in a larger number of animals, new mixtures of serum and spores were made in the proportions and manner previously described, and the experiment was repeated, using the same precautions which were taken in the previous experiments to insure and prove the toxin-producing ability and viability of the spores. The animals, both cholera immune and susceptible, shown in Table 8, gained weight during the entire test period and showed no undesirable effects following the injection of this spore-anti-hog-cholera-serum mixture, either when used alone or simultaneously with hog-cholera virus. Each 30 c.c. dose contained approximately five billion spores.

To determine whether or not *B. botulinus* and hog-cholera virus in symbiosis exert an action which differs from that obtained by a *B. botulinus*-hog-cholera-serum mixture as shown in Table 8, the following experiment was conducted: Spores were planted in commercial hog-cholera virus, following the technique previously described. This was injected simultaneously with anti-hog-cholera serum into both susceptible and cholera-immune swine. It will be observed in Table 9 that all animals inoculated with this material remained well.

The combined action of botulinus spores and hog-cholera virus on susceptible pigs unprotected by hog-cholera serum was next studied to determine whether such contamination altered the syndrome ordinarily observed in cholera. The time and manner in which these animals sickened differed in no respect from those of animals inoculated with virus known to be free from contamination.

The results recorded indicate that spores of *B. botulinus* in

TABLE 8.—EXPERIMENT TO DETERMINE THE ACTION OF BACILLUS BOTULINUS SPORES IN ANTI-HOG CHOLERA SERUM ON BOTH SUSCEPTIBLE AND IMMUNE SWINE.

Pig No.	Description	Material inoculated	Dosage	Results
2562	Cholera immune	Hog-cholera-serum–spore mixture	30 c.c.[1]	Remained healthy
2573	do.	do.	do.	do.
2768	do.	do.	do.	do.
3752	do.	do.	do.	do.
6545	do.	do.	do.	do.
6350	do.	do.	do.	do.
2576	do.	do.	do.	do.
3757	do.	do.	do.	do.
2612	do.	do.	do.	do.
3756	do.	do.	do.	do.
4006	do.	do.	do.	do.
3751	do.	do.	do.	do.
3779	Cholera susceptible	do.	do.	do.
3774	do.	do.	do.	do.
3777	do.	do.	do.	do.
3783	do.	do.	do.	do.
3781	do.	do.	do.	do.
3786	do.	do.	do.	do.
3788	do.	do.	do.	do.
3780	do.	do.	do.	do.
3770	do.	do.	do.	do.
3773	do.	do.	do.	do.
2769	Cholera immune	Hog-cholera-serum–spore mixture and hog-cholera virus.	do.	do.
3754	do.	do.	do.	do.
2188	do.	do.	do.	do.
2199	do.	do.	do.	do.
2774	do.	do.	do.	do.
4293	do.	do.	do.	do.
2770	do.	do.	do.	do.
3765	Cholera susceptible.	do.	do.	do.
3768	do.	do.	do.	do.
3769	do.	do.	do.	do.
3784	do.	do.	do.	do.
3778	do.	do.	do.	do.
3782	do.	do.	do.	do.
3785	do.	do.	do.	do.

[1] Each cubic centimeter contained approximately 180 million spores.

phenolized anti-hog-cholera serum failed to produce a toxin and that swine inoculated with massive amounts of spores in anti-hog-cholera serum did not develop botulism. Orr (11) has shown that botulinus spores placed in unphenolized defibrinated guinea-pig blood develop a strong toxin within 30 hours. Since

TABLE 9.—RESULTS OF INOCULATION WITH HOG-CHOLERA-VIRUS-SPORE MIXTURE.

Pig No.	Description	Material inoculated	Results
3753	Cholera immune	Virus-spore mixture (2 c.c.[1]) and Hog-cholera serum (30 c.c.).	Remained healthy
7613	do.	do.	do.
4066	do.	do.	do.
2598	do.	do.	do.
2772	do.	do.	do.
2771	do.	do.	do.
3775	Cholera susceptible	do.	do.
3772	do.	do.	do.
3767	do.	do.	do.
3776	do.	do.	do.
3766	do.	do.	do.
3771	do.	do.	do.

[1] Each cubic centimeter contained approximately 180 million spores.

this differed from our results when using a phenolized blood serum medium, the following experiment was conducted: Five-tenths of a cubic centimeter of toxin-free spore suspension was placed in 25 c.c. of unphenolized defibrinated hog blood and allowed to remain in contact for eleven days. Mice inoculated with 0.3 c.c. died in nine hours, whereas guinea-pigs receiving 0.5 c.c. died in twelve hours. It is interesting to note that the characteristic odor associated with *B. botulinus* was present in this unphenolized spore mixture, whereas it was never observed in the phenolized mixture.

Although this experiment has been conducted on a small scale, the results are in close accord with those obtained by Orr (11). The striking contrast in the results obtained with phenolized and unphenolized defibrinated blood suggests an inhibitory action upon the toxigenic activities of *B. botulinus* by the phenol in anti-hog-cholera serum and hog-cholera virus. These experiments with phenolized and unphenolized blood are being repeated on a larger scale.

SUMMARY

Examinations of 134 samples of anti-hog-cholera serum and hog-cholera virus described in this paper, supplementing 1,700 previously conducted, failed to reveal the presence of *Bacillus botulinus* or its toxin.

B. botulinus did not produce toxin in phenolized anti-hog-cholera serum.

B. botulinus in symbiosis with phenolized hog-cholera virus did not produce toxin.

A strong toxin was formed in unphenolized defibrinated hog blood which had been artificially inoculated with botulinus spores.

Healthy swine inoculated with anti-hog-cholera serum and hog-cholera virus artificially inoculated with toxin-free botulinus spores acted no differently from those which receive serum or virus free of *B. botulinus*.

Susceptible swine inoculated with hog-cholera virus and botulinus spores showed no difference in temperature, symptoms, postmortem lesions nor time of sickening from those regularly used in virus production.

In unphenolized hog blood in which *B. botulinus* is growing

the odor considered characteristic of *B. botulinus* was marked, whereas in phenolized anti-hog-cholera serum or virus no odor was observed.

REFERENCES TO LITERATURE

1. Jour. Amer. Vet. Med. Assoc., Oct., 1921, p. 76.
2. Amer. Jour. Pub. Health, April, 1921, p. 352.
3. Jour. Med. Research, vol. 42, No. 2, p. 129.
4. Jour. Infect. Diseases, Sept., 1921, p. 267.
5. Jour. Path. and Bact., Jan., 1916.
6. Jour. Amer. Med. Assoc., May 1, 1920, p. 1220.
7. Arch. Internat. Med., 1921, vol. 27, p. 265.
8. Jour. Amer. Med. Assoc., Jan. 11, 1919, p. 88.
9. Jour. Canadian Med. Assoc., 1918, p. 2.
10. Jour. Amer. Med. Assoc., Sept. 20, 1919, p. 907.
11. Jour. Infect. Diseases, Jan., 1922. p. 118.

DISAPPEARANCE OF MALARIA IN TEMPERATE CLIMATES

Malaria, formerly a disease common to the temperate as well as to warmer climates, has now become practically extinct in the temperate zone and is rapidly disappearing even in warmer regions. Dr. C. Joyeux,[1] professor of parasitology in the Paris Medical School, has recently commented on the disappearance of the disease from France. There is evidence to show that this disease was extremely prevalent in France in past centuries. Now Joyeux presents evidence that the anopheles still abound in many regions, although there has been little or no malaria for generations in these districts. He calls attention to the explanation for this paradoxical fact published simultaneously by Roubaud [2] in France and Wesenberg-Lund [3] in Denmark. According to these observers the mosquitoes, which used to feed on human blood, still do so in tropical countries; but in temperate zones they are attracted to barns and stables where they can find moisture, warmth and protection from the winds, and where they can feed on horses and cattle. According to Roubaud, in the course of time the mosquitoes have apparently developed a zoophile strain, being more attracted to cattle than to human blood. This has contributed to the elimination of malaria in the colder countries.—*Journal of the American Medical Association* (*Nov.* 12, 1921, *vol.* 77, *p.* 1578).

[1] Joyeux, C. Presse Méd., vol. 29, p. 1392 (Sept. 24, 1921).
[2] Roubaud, E. Ann. Inst. Pasteur, April, 1920.
[3] Wesenberg-Lund. Mém. Acad. Roy. Sci., vol. 7, p. 8 (1920-21).

CLARIFICATION OF HOG-CHOLERA DEFIBRINATED-BLOOD ANTITOXIN

By R. R. HENLEY

Biochemic Division, Bureau of Animal Industry, United States Department of Agriculture

THE METHOD of preparing clear and sterile anti-hog-cholera serum described by Dorset and Henley (1) in 1916, and now in general use in the industry, is applicable only to fresh and non-phenolized defibrinated or citrated blood. For various reasons it may be desirable to clarify, concentrate, or, at times, sterilize old phenolized defibrinated-blood antitoxin. In the past this has been done either by a modification of the Banzhaf-Gibson (2) process or by the heat-salt process (3) developed in these laboratories. As those processes are expensive and are difficult and tedious of operation, efforts have been made to develop a process that will serve to clarify, concentrate and sterilize old defibrinated-blood antitoxin as simply and easily as the bean-salt (1) process accomplishes those ends in the case of fresh defibrinated or citrated blood.

In fresh defibrinated-blood antitoxin the cells, which are known to be inert, are intact, and on this account the entire cells, both the stroma and contents, consisting for the most part of hemoglobin, can be separated easily from the serum by the bean-salt process. In old defibrinated-blood antitoxin a very different condition exists, because of the fact that the greater part, if not all, of the cells have been broken down or hemolyzed and the liberated hemoglobin has passed into solution in the serum. Bean extract will agglutinate and thus facilitate the removal of the disrupted stroma, but it has no effect whatever upon the dissolved hemoglobin, and so is of no avail in aiding its removal.

It was believed that a selective precipitant for hemoglobin could be found, and a search for such a reagent was instituted. In this search the action of a great variety of materials was studied, and simultaneously a search of the literature was conducted. A statement by Mann (4) that chloroform would precipitate hemoglobin attracted attention and promised fulfillment of the quest. While the first attempts to precipitate hemoglobin

with chloroform were disappointing, in that only small amounts of hemoglobin were precipitated, it was soon found that this precipitation was complete (1) if the blood contained at least 0.5 per cent of phenol, (2) if the temperature of the blood did not exceed 40° F. when the chloroform was added, and (3) if the mixture of blood and chloroform was thoroughly shaken. When the factors influencing the action of chloroform on hemoglobin were understood the following process to separate clarified serum from old blood was devised.

PROCESS FOR THE REMOVAL OF STROMA AND HEMOGLOBIN FROM OLD DEFIBRINATED-BLOOD ANTITOXIN

Step 1. Addition of Precipitants

A. Addition of bean extract to remove cells and stromata—To 500 c.c. of phenolized (0.5 per cent phenol) old defibrinated-blood antitoxin in a balloon flask, previously chilled to 40° F. or lower, 10 to 15 c.c. of bean extract (5) is added and the contents of the flask are agitated by hand.

B. Addition of chloroform.—Immediately following *A*, 50 c.c. of chloroform is added to each 500 c.c. of blood and the contents of the flask are agitated by hand.

C. Addition of salt.—This procedure should be used only when the serum is to be separated from the clot by *filtration* as described later. Promptly following the completion of *B*, add 5 grams of sodium chloride and transfer the flask and its contents immediately to a shaking machine.

Step 2. Shaking

Unless shaking promptly follows the addition of chloroform a clot will form at the bottom of the flask; therefore the transfer of the flask and its contents to the shaking machine should follow immediately the completion of Step 1. It is essential that the mixture of the blood and chloroform be agitated thoroughly in order to secure the maximum precipitating effect. For shaking, a power-driven Camp shaking machine is used, but other shaking machines will doubtless answer the purpose. The mixture is shaken for 10 minutes, following which the blood will be found to be in a semisolid clot from which a clear, light-red serum will exude on standing.

Step 3. Separation of Serum

The serum may be separated from the clot by centrifugalization, or by filtration.

(*1*) *Centrifugalization.*—Either the continuous or bucket type centrifuge may be employed. As the blood after shaking is

usually clotted into a semisolid mass, it is necessary, in order to remove it from the container, to break the clot. This may be accomplished easily if the clot is allowed to stand until the serum exudes and then is slightly shaken by hand until it is reduced to the desired fluidity. With this precaution the serum may be easily separated from the clot by either type machine. It may be mentioned, however, that it will be advisable to use a continuous type machine only when it is of sufficient capacity to care for a considerable quantity of precipitate. Separation with the bucket type machine is accomplished in the same manner as in the separation of serum from cells of fresh defibrinated or citrated blood by the bean-salt process.

(*2*) *Filtration.*—The separation of the serum from the clotted hemoglobin may also be accomplished by filtration through paper. For filtering the serum from the clotted hemoglobin a filter tray[1] instead of the usual funnel has been employed advantageously. The clotted blood is filtered in lots of 1,000 c.c. each, as the filtrate from this amount of blood has been found to pass through one tray in 8 to 12 hours, giving a transparent, light-red serum. A yield of at least 500 c.c. of clear serum should be obtained from each 1,000 c.c. of blood at this stage, but this does not represent all of the serum present, as, because of the bulkiness of the hemoglobin precipitate, a considerable portion of the serum remains mechanically held in the precipitate. In order to recover this it is necessary to press it out of the precipitate, for which purpose the precipitate and the paper are transferred to a muslin cloth, which, after being folded into a bag-like shape, is placed in a fruit press and the mechanically retained serum pressed out. The volume of the pressings should not be less than 150 c.c. from the clot representing each 1,000 c.c. of blood. The expressed serum is combined with the clear serum obtained by direct filtration, as above described. In case the pressings are not entirely clear, they are clarified, previous to combination with the clear filtrate, by thoroughly incorporating in the pressings ½ to 2 per cent of powdered infusorial earth and filtering the mixture through paper. This will remove effectually any trace of cloudiness from the pressings.

Step 4. Heating and Phenolization

The serum obtained as above described may be heated to 58° C. for one-half hour in the same manner and with the same results that attend the heating of clear serum obtained from fresh defibrinated blood.

Although a defibrinated blood may contain 0.5 per cent phenol, the amount usually added to insure keeping, it has been found that clarified serums obtained as a product of this process contain

[1] Ka Ki filter tray.

on an average only about 0.2 per cent phenol, an amount insufficient to prevent spoilage; so it is necessary to add sufficient additional phenol to bring the phenol content to 0.5 per cent. Assuming the presence of 0.2 per cent phenol, it is then necessary to add of 5 per cent phenol one-fifteenth of the volume of the serum to be treated. Thus, if one has 950 c.c., add 1/15x950, or 63 c.c. of 5 per cent phenol.

PRECAUTIONS TO BE OBSERVED

The following precautions should be observed:

1. The blood should always be chilled to 40° F. or lower before adding the precipitants required in Step 1.
2. The blood should be transferred to the shaker and shaken immediately following the addition of the precipitants.
3. Shaking should be only sufficient to form a clot. Prolonged shaking will break the clot and render separation more difficult. Experience will soon teach the proper time to discontinue shaking.
4. After the clot has formed and the flask has been removed from the shaker, the flask may be allowed to stand until the clot contracts and serum exudes.
5. Phenol should be present in the defibrinated-blood antitoxin to the amount of at least 0.5 per cent. The addition of 40 c.c. of 5 per cent phenol to each 1,000 c.c. of phenolized defibrinated blood yields a product of slightly less color than if it is not employed, but products obtained in this manner have not been tested for potency, and the use of this additional phenol is not recommended at this time.
6. Because of the variation in amount of hemoglobin present in old blood, the amount of chloroform to be used can not be definitely stated. Fifty c.c. of chloroform to 1,000 c.c. of blood has been found to be ample in all cases. The minimum amount necessary to give complete precipitation should be used.
7. The clot after separation of the serum should be sufficiently dry to crumble when handled.

RESULTS OBTAINED BY THE APPLICATION OF THE PROCESS TO OLD DEFIBRINATED-BLOOD ANTITOXINS

The process has been applied to a large number of old defibrinated-blood antitoxins, as a result of which considerable data have been accumulated. In order to avoid the presentation of this rather large mass of detail, the results are merely summarized as follows:

1. Yields.—The yields of clarified serum by this process vary rather widely, due, in great part at least, to the wide variation in the amounts of hemoglobin that may be present. Of seventeen

old defibrinated bloods treated by the process, using centrifugalization in some cases to separate the serum, and filtration in other cases, the yields of clarified serum obtained, before final phenolization, varied from 56 to 75 per cent of the original volumes subjected to treatment, and gave an average yield, before final phenolization, of approximately 65 per cent. On the addition of the required amount of 5 per cent phenol solution necessary to insure a phenol content of 0.5 per cent in the finished product, the average final yield was approximately 69 per cent of the original volume treated. Blood to which salt was added gave as a rule slightly increased yields over corresponding blood to which no salt had been added.

A fresh defibrinated blood gave a yield of clear serum by the regular bean-salt method of 72.5 per cent, and the same blood after phenolization gave a yield of 67.2 per cent of clarified serum when treated by the bean-salt-chloroform process.

2. Indicated losses.—A chemical analysis of bloods before and after treatment by the process indicated that about 10 per cent of the globulins, which carry the antitoxin, may have been lost. However, in the method of analysis some stromata may have been determined as "globulins lost," and the figure 10 per cent may be too high. Some loss due to retention of the serum by the clot must occur. This loss may be minimized by insuring thorough separation of serum and clot.

3. Effect of the process on bacterial count.[1]—Two old defibrinated-blood antitoxins which contained an average of 15,000 organisms per cubic centimeter, as determined by counts made on agar plates, were subjected to treatment by the process, and the final product, on plating, was found to be sterile.

4. Effect on phenol content.[2]—Clarified serums obtained as products of this process contained, on an average, only 0.2 per cent of phenol, although defibrinated blood from which they were prepared contained 0.5 per cent phenol.

5. Results of tests on hogs.—As it is recognized that the bean-salt process is an effective process for the separation of a clear, potent serum from defibrinated or citrated hyperimmune blood, and as the process described herein differs from that process only in that chloroform is used, it was not considered necessary to

[1] Test conducted by Dr. F. W. Tilley, Biochemic Division.
[2] Mr. R. M. Chapin, of the Biochemic Division, kindly made these determinations.

carry on any extended investigation as to the effect of the process on the potency of the serum. However, in order to determine if the addition of chloroform was in any way injurious, Serum 262, a defibrinated-blood antitoxin prepared in the Bureau of Animal Industry's laboratories, was treated by the process and the products were tested for potency.[1] Two products were obtained: (1) A clear, *unheated,* phenolized serum, and (2) a clear, *heated* serum. The total yield of clarified serum, after final phenolization, was 80 per cent of the original volume of blood treated. On this account the clarified serum was tested in doses of 80 per cent of those of the original defibrinated blood; that is, 10 and 15 c.c. doses of the original untreated blood were given to pigs that also received 2 c.c. virus each, and 8 and 12 c.c. doses of the clarified serums were given to pigs which also received 2 c.c. of virus each. All pigs remained normal throughout the test except one pig that received 12 c.c. of clarified heated serum and one pig that received 8 c.c. of clarified unheated serum. Each of these pigs exhibited slight diarrhea on the second day of the test, but showed no other reaction.

CONCLUSIONS

Of the various processes for the refinement and sterilization of old hog-cholera defibrinated-blood antitoxin which this laboratory has tried out, some on a large commercial scale, the process described herein appears to be by far the simplest and most practical. This process has never been applied on a commercial scale, therefore anyone contemplating its employment is cautioned to familiarize himself with the various steps of the process by first applying it to small quantities of blood. Furthermore, products obtained from such small quantities should be subjected to rigid potency tests in order to check up any losses in potency that may occur.

SUMMARY

The factors governing the reaction between chloroform and hemoglobin by which the hemoglobin of the blood may be precipitated were studied, and a process, based upon this reaction, for the separation of a clear, sterile serum from old defibrinated-blood antitoxin was devised.

[1] Dr. W. B. Niles conducted the potency tests.

It is shown that the yield of clarified serum separated by this process from old defibrinated-blood antitoxin approximates 70 per cent of the original volume, and that the product of the process is free from bacterial contamination. While analysis indicates that the globulin content of the serum suffers a slight loss, potency tests indicate that the loss of antibodies during clarification is very slight.

REFERENCES TO LITERATURE.

1. DORSET, M., and HENLEY, R. R. Jour. Agr. Research, vol. 6, No. 9, pp. 333-338.
2. BANZHAF, F., and GIBSON, R. Jour. Biol. Chem., vol 3, No. 4, pp. 253-263.
3. U. S. Dept. of Agriculture, Rept. of the Chief of the Bureau of Animal Industry. 1918-1919, p. 53.
4. MANN, GUSTAV. Chemistry of the Proteids, p. 472. London, 1906.
5. DORSET, M., and HENLEY, R. R. Jour. Amer. Vet. Med. Assoc., vol. 50 (n. s., vol. 3), No. 6, pp. 699-702.

A DOUBTFUL HONOR

An honorary medical degree has been conferred on former Field Marshal Ludendorff of the German Army by the medical faculty of the University of Königsberg in East Prussia. This news is chronicled in the *Munchener Medizinische Wochenschrift* under the significant heading "Let Us Hang Our Heads." In the diploma it is stated that the honorary title is given to "the hero who with the sharp blows of his unconquered sword protected the German people from the crowd of booty-hungry enemies." The *Darmstadter Zeitung*, official organ of the government of Hesse, remarks sarcastically: "Murder of the masses and doctor of medicine—they go well together." The attitude of evident disapproval on the part of these two influential journals goes far toward offsetting the action of the University and shows that German sentiment is not all in favor of honoring the late military "heroes."

Belgium has a state school of practical horseshoeing. Diplomas were granted to seventeen pupils who passed the 1921 examinations.

Investigation by the American Horse Association results in the statement that a better grade of horses appears on the streets of Boston than on those of any other city in the Union.

EFFECTS FOLLOWING IMPROPER METHODS OF EXTRACTING HYPODERMA LARVÆ FROM THE BACKS OF CATTLE

By S. HADWEN

Chief Veterinarian, Reindeer Investigations in Alaska, Bureau of Biological Survey, United States Department of Agriculture

IT HAS GENERALLY been conceded by veterinarians, entomologists and others that the extraction of warble larvæ from the backs of cattle should be recommended to farmers. The benefits from the point of view of lessening the numbers of the parasites are obvious and can not be denied. As each warble fly may deposit several hundred eggs, every larva destroyed means much toward lessening the evil.

In 1916 the writer (1) called attention to the fact that the proteins contained within *Hypoderma* larvæ had toxic properties when injected into susceptible animals; that they produced marked symptoms and in some cases fatal results. In 1917 Hadwen and Bruce (2) published a full description of the experiments. The cooperative work accomplished in Denmark in the removal of *Hypoderma* larvæ has been referred to many times in the writings on warble flies, and it would seem opportune to review two of the latest papers on the subject. In a general way these papers show that the extraction of warble larvæ is not without its attendant dangers. To the writer it seems clear that Danish veterinarians have only just lately recognized the fact that a disease they designate as rosenfeber may follow the extraction of the larvæ.

Laust Brodersen (3), 1919, writes a very clear and concise paper on his observations made in a farming community in Norre Nebel, Denmark. He describes a disease in cattle which has some similarity to urticaria and which he calls rosenfeber. The affection is found during the spring and summer, and the cases are reported as occuring during the daytime or evening. Briefly the symptoms noted are as follows:

Fever is present, the pulse is full, the jugulars are distended. Tremors are noticed, especially of the lips, and the animals are restless and unruly. Edemas are the rule; the eyelids, muzzle,

submandibular region, occasionally the udder, the anus, and vulva are affected. Tears drop from the eyes, mucus from the nose, and there is frothing at the mouth. Breathing is labored and accompanied by a hissing sound. There is slight tympanitis, and rumination is irregular. The feces are thin and are discharged frequently. The treatment consists of bleeding, cold applications and febrifuges. The disease is acute, usually running a benign course.

In 1914-15 Brodersen saw many cases of rosenfeber in cattle following the extraction of the larvæ. He gives notes on seven cases which he treated. They occurred from April 20 to May 31. He also treated three cases in May, June and July where no larvæ had been extracted. In these latter cases he wonders if the larvæ had not been accidentally injured, and says that if this is the case, rosenfeber is a sickness caused by the absorption of poisonous material from the larvæ, or, more likely still, to the foreign albuminous material in the larvæ, and that if this theory is correct "the disease must be related to the so-called serum sickness." Brodersen does not mention any fatal cases.

In my preliminary note and in the subsequent paper with Bruce, fatal cases were described following the injection of warble juices. Several additional symptoms and lesions were described, such as coughing, bleeding at the mouth and anus, irritation of the skin, and a cyanosed appearance of the body. After the death of the animals, which was due to asphyxia, the blood remained incoagulable. These fatal cases may occur naturally, and if so, it is unlikely that veterinarians would have seen them, as death occurred in a few minutes.

As soon as the findings recorded by Brodersen were understood by most of the farmers, he states that they became frightened and completely stopped the practice of extracting the larvæ. He believes that the people who were paid to perform this work could not do so without damaging some of the larvæ, as they made only three visits to each herd during the season. The farmers were advised to undertake the work themselves.

Professor C. O. Jensen, 1919, reviews Brodersen's paper and recalls an experiment which he made on a calf sixteen years previously. This animal was injected with the juice derived from two small *Hypoderma* larvæ. In from one-half to two hours it developed symptoms suggestive of rosenfeber. An immense

edema of the eyelids and the anus occurred, also of the connective tissues elsewhere. Professor Jensen suspected rosenfeber, but did not like to call it so on account of its occurrence at the wrong time of year. Now that Brodersen has published his observations, Jensen says that it is very probable that all cases of rosenfeber are in some way or other connected with *Hypoderma* larvæ. Jensen argues that the toxic material acts like a lymphagogue of a transient nature. He writes at some length on the edemas found surrounding the larvæ in the gullet, and believes that they are not inflammatory, though Kock and De Vries consider that they are so. If the edemas are permanent they should produce clinical manifestations of their presence.

Jensen further states that during the past years no clinical observations have been brought out which would argue against the transient nature of the disease, with the exception of a single case of tympany. In this connection he mentions an interesting report by De Vries. A young animal, after feeding, suddenly became unable to swallow and was vomiting. A sound was introduced into the esophagus and difficulty was experienced in forcing it through the posterior end. A diagnosis of stenosis was made, probably due to a foreign body. The animal was slaughtered and in the posterior part of the esophagus a number of *Hypoderma* larvæ were encountered together with edemas of the submucosa. No foreign body was found and no injury to the esophagus. Prof. Jensen concludes that it is likely that a number of such cases have been misinterpreted in practice.

Jensen (4) says also: "The extraction of *Hypoderma* larvæ has been considered rather safe hitherto. In circulars issued by the German Imperial Health Department it is stated that there is no need to be afraid of injurious effects following the extraction of the larvæ. From different sources, however, it had been learned that urticaria might occur. Schöttler saw urticaria following in cases where the larvæ had been punctured and then squeezed out. He also said that by this method of treatment serious suppuration may follow. But as far as I know, no one has previously observed that the extraction may be followed by rosenfeber or similar disease."

The symptoms connected with Jensen's experiment which he saw after the injection he considers came on too rapidly for the albumen to be the toxic element responsible for them. In this

latter statement no doubt Jensen is wrong. The time he gives of one-half to two hours for the symptoms to develop is very much longer than necessary in most cases, when injections are made. In the 1916 experiments we found that in the fatal cases the results were immediate, and in the non-fatal they generally came on in a shorter period than half an hour. In some more recent experiments conducted on 10 calves, the three animals which gave marked reactions showed symptoms in fifteen to twenty minutes.

Jensen's idea that the swellings in the esophagus are transient is correct in a sense, and Hadwen and Bruce have shown that the larvæ move away when surrounded by edema. But they still remain in the esophagus, consequently the reaction against them still goes on, though the situations of the swellings may change. The question resolves itself largely on the degree of resistance on the part of the animal, as to whether the swellings are large or small (5).

CONCLUSIONS

The disease called "rosenfeber" in Denmark appears to be identical with hypodermal anaphylaxis. The reader is referred to articles which have appeared in this journal on this subject.

Squeezing out *Hypoderma* larvæ from the backs of cattle is a good method for lessening the numbers of warble flies and has been attended with considerable success in Denmark. However, to avoid unfavorable after-effects in the animals, the extraction of the larvæ must not be undertaken hastily nor must rough methods be used. Above all the larvæ must not be injured in the process.

The walls of the sac in which the larva lies are in the nature of a defensive barrier. This sac, in addition to holding the larva, contains pus cells and bacteria in many cases. It may also hold toxic material excreted by the larva. Therefore if the walls are lacerated a variety of reactions may take place. Softening the skin first with water and then squeezing the warble sacs should remove most of the larvæ. In cases where a larva can not be extracted by this method a round-ended pair of forceps might be used to stretch the opening and to assist in drawing it out. After the larva has been removed the cavity should be flushed out with clean water. In the cases where a larva has been rup-

tured accidentally the parts must be washed quickly to dilute and remove the toxic material.

The cooperative work in connection with the extraction of warble larvæ in Denmark had in 1919 been going on for some years, apparently without any drawbacks. At this late date, however, the Danish veterinarians and subsequently the farmers have discovered that troubles may follow what they thought was a perfectly safe practice. It would seem evident that the work was undertaken without a sufficient number of properly controlled preliminary tests.

It must not be thought, however, that the Danish veterinarians are to blame for not having foreseen or recognized the danger in removing the larvæ. The profession generally considered that the extraction of the grubs was simply a mechanical piece of work and was quite without danger to the host. When the cooperative work began in Denmark the dangers from *Hypoderma* were unknown.

The point the writer wishes to establish is that other countries should profit by the Danish experience. He still favors the extraction of the larvæ (and has so stated elsewhere), but he believes that before laymen are advised to undertake it in a wholesale manner further tests must be made.

The symptoms of anaphylaxis are so striking, though the disease is as a rule without danger of fatal results, that to a farmer it appears to be a serious matter. The cases which have been reported so far are few in number, but now that attention has been called to them, they may be found to be more common than was supposed. It is for this reason that careful tests should be made to settle this point.

1. HADWEN, S. 1916. Hypodermal anaphylaxis. Jour. Amer. Vet. Med. Assoc., vol. 2, No. 3, pp. 72-74, Figs. 1-2.
2. HADWEN, S., and BRUCE, E. A. 1917. Anaphylaxis in cattle and sheep, produced by the larvæ of *Hypoderma bovis*, *H. lineatum*, and *Oestrus ovis*. Jour. Amer. Vet. Med. Assoc., vol. 4, No. 1, pp. 15-41, Figs. 1-15.
3. BRODERSEN, LAUST. 1919. Om Rosenfeber hos Kvaeg. Maanedsskrift for Dyrlaeger, vol. 31, pp. 321-323.
4. JENSEN, C. O. 1919. Bemaerkninger on Hypodermalarvernes Forhold til Rosenfeber. Maanedsskrift for Dyrlaeger, vol. 31, pp. 324, 326.
5. HADWEN, S. 1918. Natural occurrence of eosinophilias. Jour. Parasitology, vol. 4, pp. 135-137.

LABORATORY DIAGNOSIS OF POULTRY DISEASES[1]

By L. D. BUSHNELL *and* F. R. BEAUDETTE

Bacteriological Laboratories, Kansas Agricultural Experiment Station, Manhattan, Kansas

DURING the past few years the Department of Bacteriology has carried on investigational work in poultry diseases, and from the experience thus obtained we have been able to systematize the work considerably. While we have devised no new methods, we feel that the information obtained and the laboratory methods used may be of value to others. The aim in this work has been to make a rapid and accurate diagnosis of diseased conditions. That an accurate diagnosis is necessary goes without question, and from our own experience we have found that such a diagnosis based upon clinical and external symptoms alone is very often impossible.

As the poultry industry is one of the most important branches of agriculture, and as the people are gradually learning the value of poultry on the farm, the veterinarian should interest himself to a greater extent in poultry diseases and their correct diagnosis and control. We believe that the proper use of a bacteriological laboratory as an aid to the diagnosis of poultry diseases will greatly aid the busy practitioner and improve methods for the control and eradication of poultry diseases.

Since the beginning of the investigational work in this laboratory we have found some diseases quite prevalent in this State that were not known to occur here. Fowl typhoid may be given as an illustration. The diseased specimens were sent to the laboratory from various parts of the State, as well as including the vicinity of the Station.

A great many letters of inquiry have been received regarding poultry diseases. In some instances the description given was so characteristic that there was no doubt of the diagnosis. In other cases the description was incomplete or misleading. In replying to such letters we have suggested measures to be executed until a correct diagnosis could be made. In the meantime, the owner was instructed to send to the laboratory two or three

[1] Contribution No. 42 from the Bacteriological Laboratories of the Kansas Agricultural Experiment Station.

of the affected birds for examination. These are sent by express in wooden crates, but chicks come admirably by parcel post in perforated pasteboard boxes.

CLINICAL FINDINGS

As soon as the live birds reach the laboratory a careful examination is made, which often permits an immediate diagnosis. Such is the case with those local conditions termed roup, bumblefoot, etc. Here the caseated mass found beneath the eyelids, the diphtheritic patches in the mouth and throat, or the wart-like growths on the unfeathered portions of the head lead to the diagnosis of roup, and the swollen foot to a diagnosis of bumblefoot. In other cases the symptoms are less suggestive and the birds must be kept until more specific symptoms develop or until death permits a postmortem and bacteriological examination. The nature of the droppings is noted, and if diarrhea occurs such diseases as cholera, fowl typhoid, botulism, and, in the case of chicks, white diarrhea, or in turkeys, blackhead, are indicated. The color of the droppings is also of value in that in certain affections there is a more or less characteristic color. Much whitish material and mucus in the feces is an indication of cholera, or white diarrhea in the case of baby chicks. A greenish tinge is indicative of fowl typhoid, though not of impossible occurrence in cholera. In doubtful cases the age of the bird might aid in the diagnosis, as fowl typhoid more often occurs in adult birds, while cholera affects birds of all ages. The whitish droppings of a bird suffering from botulism resemble those of a cholera fowl, but in this disease the other symptoms are so charactertistic that we need not depend upon this feature. The yellowish droppings of the consistency of thick paint are seen only in cases of blackhead. These are often designated as "sulphur" droppings.

The color of the comb may be used as a guide in making a diagnosis, since this symptom is very reliable in cases of botulism, where a persistent bright red color is always seen. In cholera there is a marked tendency toward cyanosis, while an anemic comb is suggestive of fowl typhoid. The comb of an individual suffering from blackhead resembles that of one affected with cholera. A high temperature is not as diagnostic as

a subnormal one. The former may indicate any of the septicemias, while the latter is highly indicative of botulism.

BLOOD CULTURES

If the septicemias are suspected an attempt is made to culture the organism from the heart's blood while the bird is still living. The individual is placed in lateral recumbency with the left side up. After washing thoroughly the area over the heart with a 5 per cent solution of phenol, a point on an imaginary line drawn from the tip of the sternum to the back is located where maximum pulsation can be felt. About 1½ to 2 inches from the point of the sternum a 2-inch sterile needle of 22 gauge, attached to a sterile Luer syringe, is inserted into the heart and a small amount of blood withdrawn. A portion of this is put in broth containing 1 per cent citrate to prevent clotting, and another portion is streaked on an agar plate. The use of the citrated broth is of value chiefly for the isolation of *Bacillus avisepticus* and *B. sanguinarium*. From the agar plate either may be obtained. A combination is an advantage. By such a procedure the organism can in many cases be cultured and identified before the death of the bird. In case no culture is obtained the bird is still available for further study.

The following record sheet is filled in for each case and a careful record kept of each bird:

RECORD SHEET

Case No. ..... Date ..... Cage No. .....
Owner .....
Address .....
Breed ..... Age .....
Sex ..... Leg band No. .....
History .....
Temperature .....
Pulse .....
Respiration .....
External symptoms .....
Diagnosis .....
Treatment .....
Prognosis .....
Disposal .....

Laboratory Diagnosis and Postmortem Findings

Blood stain .....
Agglutination (*B. pullorum*) .....
Other tests .....
Digestive tract .....
Respiratory .....
Urino-genital .....
Parasites .....
Miscellaneous .....

POSTMORTEM TECHNIC

As soon as an individual dies a careful postmortem examination is made. The feathers are thoroughly soaked to prevent dust. The bird is laid on its back and a linear incision is made through the skin from the vent forward, over the crop along the mid-ventral line. The skin is then removed from the sides and the exposed surface flamed. By means of a flamed knife, forceps and scissors an incision is made across the abdomen just behind the sternum. This is carried forward on both sides through the ribs to the anterior part of the sternum, where bone forceps are used to disarticulate the attachments. Such a flap laid forward exposes the abdomen and thorax. A red-hot spatula is used to sear the surface of the heart and liver. A Pasteur pipette is then used to aspirate material from these organs for cultures. In making the Pasteur pipettes a 6-mm. glass tube having thin walls is cut in 10-cm. lengths. These are plugged with cotton at each end and autoclaved in packages containing three or four. These may then be stored in the laboratory for future use. When desired for use a tube is withdrawn from the package, heated in the middle in a Bunsen flame, and drawn out into a capillary tube. By breaking such a tube two pipettes are made. It has been found that by using the Pasteur pipette a maximum number of pure cultures can be obtained. Such a pipette is much more effective than a wire loop, since larger amounts of material can be transferred. In taking material from the liver of birds dead for some time, the specimen should be taken in an area some distance from the surface of the intestine.

The agar plates used for streaking are made from meat infusion with a reaction of about pH 8.0. The fluids from the tissues should be well streaked over the surface of the agar with a sterile wire loop, otherwise growth may not occur. If growth occurs on the plates, fermentation tubes containing dextrose, lactose, maltose and saccharose broth, as well as tubes of nitrate broth, peptone solution and litmus milk, are inoculated. Bromthymol-blue is added to the fermentation tubes as an indicator. These tubes are incubated at 37°C. and observations are made daily. By means of the fermentation reactions the organism can usually be identified in 24 hours. The reduction of nitrates

is tested after Griess's method, and Ehrlich's aldehyde is used in testing for indol production. The culture should be allowed to incubate four days for the latter test.

The following protocol will illustrate the reactions of the more common organisms isolated:

Name	Dextrose		Lactose		Maltose		Saccharose		Nitrate Reduction	Indol Formation	Litmus Milk
	A	G	A	G	A	G	A	G			
B. sanguinarium.....	+	−	−	−	+	−	−	−	+	−	Acid, alkaline in about 14 days.
B. avisepticum.....	+	−	−	−	−	−	+	−	+	+	No change.
B. pullorum.....	+	+	−	−	?	?	−	−	+	−	Acid, then alkaline in 14 days.

Key to symbols: + = positive; − = negative; ? = variable reactions.

In cases of suspected tuberculosis an acid-fast stain of material from a lesion will suffice.

A careful search is always made for intestinal parasites and the air-sac mite.

Botulism has but recently received a proper amount of attention as a disease of poultry. The chief symptom is that of limberneck in fowls, and a laboratory method of diagnosis is quite essential. A rapid diagnosis is sometimes made as follows: Wash the contents of the gizzard into a flask of sterile salt solution and after shaking the suspension thoroughly allow to stand until the coarser particles have settled. A few cubic centimeters of this material is passed through a Berkefeld filter and 1 c.c. is inoculated into each of two guinea-pigs. Inoculate one of the pigs with 250 units of polyvalent botulinus antitoxin as a control for toxic conditions not due to *B. botulinus*. Symptoms of intoxication often develop in the animals within twenty-four hours after inoculation. The first sign is that of a slight paralysis of the legs and the inability to swallow. The symptoms become more and more pronounced until death ensues.

A new milk-producing champion for the territory east of the Rockies has been discovered in Kolrain Finderne Bess, a Holstein cow owned by F. F. Field, Dutchland Holstein Farms, Brockton, Mass. Her record is 32,563 pounds of milk in one year.

PENNSYLVANIA INSTRUCTIONS FOR THE OPHTHALMIC TUBERCULIN TEST

By T. E. MUNCE
State Veterinarian, Harrisburg, Pennsylvania

THE Bureau of Animal Industry, Pennsylvania Department of Agriculture, issues the following instructions to Bureau agents and practicing veterinarians with regard to the ophthalmic tuberculin test:

Pennsylvania does not recognize the ophthalmic tuberculin test as an official test when used alone. It is a most valuable adjunct and can be used at any time, or in combination, without interfering with the efficiency of the other tuberculin tests or having its results modified by their influence.

TECHNIQUE

As in the other tuberculin tests, the identity of each animal should be established and recorded. Examine the eyes for any abnormal conditions. Do not apply the test to animals which show any local inflammation of the eye.

Ophthalmic tuberculin is prepared in both disc and liquid form. In applying the liquid, a curved glass dropper, with an outlet as small as possible, is preferable. The animal's head is held by an assistant in such a position that when the operator drops the liquid tuberculin into the eye it will be diffused over the entire surface. Close the eyelids with the hands for a few seconds, to prevent escape of the tuberculin.

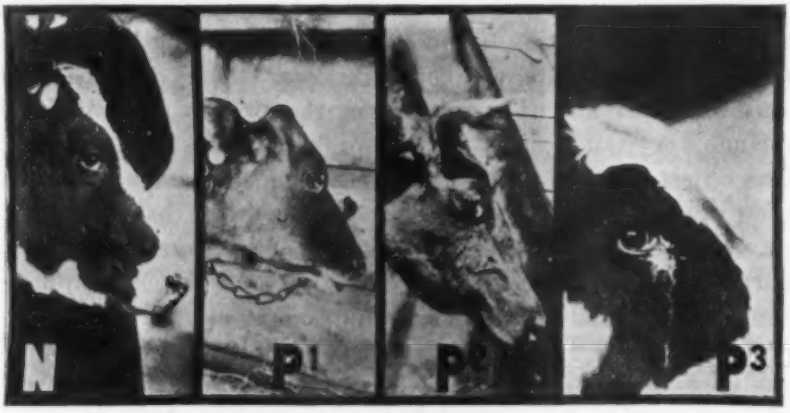
In instilling the disc, place the disc between the thumb and the first finger. Remember that clean hands with short, smooth finger nails are necessary. The animal's head must be held by an assistant in such a way that the operator can, with his thumb, place the disc well back on the eyeball, under the upper lid, and toward the outer canthus of the eye. The hand should then be placed over the eyelids for a few seconds, until the disc dissolves.

APPLICATION OF TEST AND HOURS OF OBSERVATIONS

In making an ophthalmic test the eye should be sensitized with two or three drops of a 4 per cent solution of tuberculin,

or one disc when these are to be used. No record of the results of this sensitization are usually made, although sometimes a reaction occurs.

Three or four days after the eye has been sensitized we apply two or three drops of 8 per cent solution of liquid tuberculin or two discs. Observations should be made at the third or fourth



Results of Ophthalmic Tuberculin Test

hour after the instillation of the tuberculin and continued every two hours until the twelfth or fourteenth hour. The other eye should be used as control.

INTERPRETATION OF TEST AND CODE FOR RECORDING RESULTS

The following code is used in recording the ophthalmic test:

1. Animals showing no reaction shall be recorded at each observation as N (negative).

2. Reaction shall be recorded as follows:

Small amount of pus.....P 1
Much pus, or a distinct purulent discharge.....P 2
Abundant pus, combined with hyperemia of the conjunctiva and swelling of the lids.....P 3

The accompanying illustrations will serve as a guide in interpreting and recording results.

In observing the results of the test, do not be confused by a slight white mucous discharge that often occurs soon after the tuberculin has been instilled.

THE VISCERA OF THE COW [1]

By S. SISSON

College of Veterinary Medicine, The Ohio State University, Columbus, Ohio

IT is hardly necessary for me to assure you that I have no intention of attempting to inflict upon you anything like a comprehensive account of the bovine viscera. Titles in programs must be short and therefore, as in the present case, usually include very much more than a speaker expects to deal with. The object of this paper is to present some data concerning these organs which, so far as the speaker is aware, have not been published, and some others which are not in agreement with current statements. A few physiological and clinical implications may be alluded to if time permits.

A little more than 20 years ago the speaker introduced into the study of the anatomy of the domestic animals the method of intravascular injection of formalin solution. It is a simple statement of fact to say that this procedure inaugurated a new era in veterinary anatomy, just as it had done in human anatomy a few years before. The most radical revision of our views has occurred with reference to the viscera, and it soon became evident that the description of these must be rewritten. Invesigation and consequent modification of our ideas are, of course, continuing, as must be the case in any branch of science which does not propose to die of inanition. To some this statement will seem a mere platitude, since they know that anatomy is a very active and growing science. Unfortunately, however, many members of our profession who should know better seem to think that the anatomical field is largely exhausted, and are satisfied with the descriptions in the literature of a generation and more ago. Such an attitude might be viewed with complacence were it not for the fact that many of the results of recent investigations are of great practical importance, and that much of our clinical literature contains numerous anatomical errors and solecisms, which are very perplexing and misleading to the student and young practitioner. It is also evident that our

[1] Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

physiological literature contains a good many statements which are obviously incorrect or are mere assumptions which have not even the merit of plausibility. The rather iconoclastic attitude which is connoted by the foregoing remarks is not assumed for the purpose of "making an impression," but simply to induce the open mind and the prompt rejection of errors which are prime factors in scientific progress.

The speaker then showed a series of about fifty lantern slides, made from photographs, taken by him, of dissections and frozen sections which had been embalmed by intravascular injection of 20 per cent formalin solution so as to fix the organs in their natural shape and position. The following are some of the more important features which were demonstrated:

The form of the lungs and the contour of the "superficial cardiac area" on both sides of the thorax; relationship of the thoracic organs to the ribs determined by the method of serial photographs and superposition of negatives; relation of these data to auscultation and percussion.

The form and position of the abdominal viscera, including the more common variations; topographic changes during pregnancy; correction of current erroneous views concerning the position and relations of the omasum and abomasum in particular; relationships of the reticulum, with clinical implications in regard to traumatic gastritis and related lesions; anatomical data with reference to the mechanism of deglutition and the movement of food in the stomach; clinical implications concerning digestive disturbances and methods of medication.

The arrangement of the uterus and ovaries, and changes of form and position in the pregnant animal; other variations; implications concerning exploration per rectum.

The French Société Centrale de Médecine Vétérinaire announces sixteen competitive prizes, ranging from 250 to 1,200 francs, and several medals, to be awarded during 1922 to veterinarians and veterinary students for excellence in various lines of education and research. The French Ministry of Agriculture granted to the society a subsidy of 1,000 francs for the year 1921. Such awards and recognition no doubt have an influence in encouraging veterinary progress.

Two French veterinarians have recently been honored by the French Academy of Sciences. Dr. Edouard Bourdelle, professor of anatomy at the Alfort school, has been awarded a prize of 2,500 francs for his work on "Regional Anatomy of Domestic Animals," and Dr. H. Velu, chief of the research laboratory of the livestock service of Morocco, has received a citation.

HERD-EFFICIENCY FROM THE STANDPOINT OF THE VETERINARIAN [1]

By EARLE B. HOPPER
New York, N. Y.

WITHIN the last few years the interest shown in dairy husbandry in this State has greatly increased. Recently the breeders have more closely associated themselves with one another and the national organizations of each breed are doing much to aid the local organizations and breeders in this State.

A few weeks ago I read the following from the *Holstein-Friesian World:* "New Jersey has a well-organized Holstein association with active breeders in charge of its management and with a field secretary, J. W. Bartlett, who has an acquaintance throughout the State by reason of his former connection for several years with the experiment station as a dairy extension specialist. New Jersey has not been organized on a State-wide basis very long, but the fund available for this work amounts to over $5,000 per year for three years and the State is adding to that fund right along."

The breeders of Guernseys, Ayrshires and Jerseys are also becoming better organized.

With this improved organization, proper advertising, State-wide publicity, etc., cattle owners within the State will come to realize the value of purebred livestock. There is an increasing number of men who realize that sections of New Jersey are ideal dairy localities. They also realize that this State is in a position to take advantage of the demands of the surrounding markets. The market for export will increase. The South is becoming more and more interested in improved livestock, and it is the belief of some breeders that the demand will be greater than the supply.

With these facts in mind, the breeders of this State have been encouraged to purchase the best animals obtainable. Due to stringent money conditions, I am sure it has been a sacrifice on the part of many; they realize, however, that when livestock of proper breeding is offered for sale that is the time to buy.

[1] Presented at the semi-annual meeting of the New Jersey State Veterinary Medical Society.

At two Holstein sales New Jersey breeders purchased 12 animals at an average of $1,580, and from three Guernsey sales 15 animals at an average of $1,888. The highest priced animal in these five sales which was purchased to come to New Jersey cost $4,150. The general average for the five sales paid by New Jersey breeders was $1,734; the average paid by the combined breeders of the other States was $823. It is therefore apparent that New Jersey breeders are obtaining the best that is offered. At our last State sale in Trenton 69 animals were sold, 60 of which were repurchased by breeders in this State at an average of $314. I have not had an opportunity to compute the results of other sales, but from observation I am sure that the same condition exists.

With this increased valuation within the State and with the increased interest of the breeders for better stock, it naturally follows that their investments in this type of animal must be protected by proper and efficient veterinary service. A few years ago the bovine in some localities represented such a small investment that it was a question whether it was advisable to pay a veterinarian half of her face value for treating her and then take the chance of losing her, or to use home remedies and simply replace her if death should follow. Today the purebred, because of special lines of breeding, oftentimes can not be replaced. It is therefore to the interest of the owner, as a protection to his investment, to procure the best veterinary service obtainable in his locality.

With an increased number of high-priced animals kept under more artificial conditions it naturally follows that the practitioner will receive more patronage from the breeders at a more remunerative fee. If the owner is not in constant association with the farm the herdsman as a rule does not care to take the responsibility of a valuable animal during any deviation from normal health, although to his mind the disorder may be of a trivial nature at the outset. Therefore we as practitioners will be called to treat the various ailments of these valuable bovines just the same as we have been called to treat valuable equines and canines.

There are many factors in the health of the bovine that have not been considered to any marked degree. Among these are feeds and feeding, breeds and breeding, diseases of the skin,

udder and feet, teat surgery, digestive disorders, dystokia, breeding diseases, and diseases and the rearing of calves.

The practitioner in order to gain the confidence of the breeders must have a working knowledge of the different types of breeds. Not long ago I was called in consultation by an owner, a new breeder, who had assembled eighteen purebred Guernsey females. The local practitioner met me at the station and on our way to the farm, after describing the case to me, told me that Mr. J. certainly had a nice little Jersey herd started. I did not wonder that the owner had but little confidence in this man, because if he made such a mistake to me very likely he had made the same mistake to him or the herdsman. If his local practitioner knew no more about cattle than that, then how could the owner entrust the entire care of this individual to him, taking a chance on losing his original investment of $800 and the calf she was carrying? We should therefore know the breeds, especially those in our locality.

We very seldom step into a breeding establishment without someone telling us what this or that cow is milking or has milked. If it is the herdsman, he is proud of the performance because he figures that through his feeding and care the animal has been able to make this fine showing. If it is the owner, he is proud to say that he owns such an animal. We should know, then, if we are told her production and age, whether she is the individual and producer they think she is. A knowledge of the different classes according to ages and breeds will enable us to converse intelligently, which may, and probably will, lead to our advice in the owner's next purchase or in one of our other clients' purchases.

Added to a knowledge of the breeds we should be good judges of dairy type and conformation. When I was visiting a good herd some time ago, which was a biennial occurrence, the wife of the owner came in. After some conversation she stopped in front of the stall in which the best female in the herd is kept and said to me: "If you can't suggest a way whereby we can have more fat on that cow's back, we will have to get rid of her, as I can't stand to see such a thin-backed animal around." After a few minutes of explaining the proper dairy type and conformation, capacity for food and power for production, I stepped to the milk chart to prove my statement that she was

the best producer in the herd. She thanked me for my information and was very much pleased to be enlightened on these few fundamental dairy facts. I have since learned that her interest in the dairy department of the farm is now almost as great as in her gardens.

We should know feeds and some of the fundamentals of feeding. For instance, an animal should be fed 1 pound of a balanced grain ration to 3 or 3½ pounds of milk up to 40 pounds. Above 40 pounds of milk she should receive 1 pound of grain to 4 or 5 pounds of milk, according to her ability to digest and assimilate. This depends largely upon the individual ability of the cow. A ration should consist of half bulky and half heavy feeds. There should not be over 40 per cent of cottonseed and oil meal (high protein feeds) in a ration. We should be familiar with a balanced ration for various types of cattle. For dairy cows: Bran 2 parts, cornmeal 1, ground oats 2, gluten 1, cottonseed 1 and oil meal 1. A good ration for calves consists of ground oats 3, hominy 3, bran 3, oil meal 1. This is also an ideal grain ration for dry stock before fitting. Service bulls receive a mixture of 1 part of bran, 2 ground oats, and 1 oil meal, quantity depending on condition of animal and number of services. Practical knowledge along these lines will enable the veterinarian to gain prestige with breeders. While visiting various localities in other States I have found that many practitioners are, to a certain extent, unfamiliar with some of the more common principles of feeding previously mentioned that are often encountered in dairy practice.

I do not feel qualified to discuss but few of these many phases of dairy practice that are presented with more and more importance as the value of our livestock increases. I have simply mentioned a few, and there are many more that should be considered, each by itself, and discussed by one who is thoroughly familiar with that phase of practice.

The few suggestions that I am going to present in handling bovine practice will be confined to breeding diseases, diseases of the newborn and the rearing of calves, as they apply to herd efficiency rather than to specific cases. The three essentials of all successful herds are a good yearly crop of calves (the ideal being one calf per cow each twelve months), a maximum milk production and maintenance of health. We can not fail in any

of the three and have efficiency. In the purebred herd calves may be the source of revenue, but we must have production for records to make the calves valuable. In the grade herd we must have production for revenue, but new milk cows are essential to keep up a maximum production. In these two extreme cases the income would be derived from the calves in the one and the milk in the other. But in either case *reproduction is the keynote.*

In order to produce a living healthy calf it is essential that the male and female elements be normal, having the power union, division and growth. Their respective points of origin and surroundings must be free from disease and harmonized by the proper secretions from both male and female at the time of copulation. The elements of reproduction, if fertilization does take place, are governed by the post function or internal secretions of the ovary and corpus luteum as well as the proper functioning of the other glands of internal secretion. There are often cases of nonfertility that may not be associated with infection; this phenomenon has already been proven in human medicine.

There are certain processes, the result of pathological and bacteriological changes in the genital tract, which greatly decrease the possibilities of fertilization. There are varying degrees of these changes and infections in both males and females, and we find these conditions in different stages of development. Fertilization between the same two animals taken as a standard may not take place. This may be due to the male, who may be totally sterile or his potency may vary from any degree of disease to normal. The female as well as the male may be diseased in any portion of her tract so that death of the sperm cell may result. Obstruction of any part of the female genital tract may prohibit the passage of the sperm cell to the ova. A change in the character of the secretions of any part of the genital tract may render the ova or sperm cells impotent. The ova may not be properly formed or eliminated from the ovisac.

If fertilization does occur, death of the resulting union may come at any time. First, because conditions may be such, due to a certain degree of infection or change, that fertilization takes place but the embryo perishes at an early date while still microscopic in size. Second, fertilization takes place, followed

by death of the fetus at any time, without immediate expulsion, resulting in decomposition, maceration, excessive formation of pus or mummification. Third, fertilization followed by expulsion of the embryo or fetus at any time prior to the normal termination of pregnancy. Fourth, fertilization followed by a living but weak calf. Fifth, fertilization, a living calf, normal parturition, followed by death of the calf in from 12 to 24 hours from septicemia. Sequelæ—retained placenta, acute metritis, chronic pyometra, salpingitis, abscess formation, adhesions and sterility.

Clinically, then, we have all stages of non-production. I do not see how we can draw any conclusion as to where premature birth or death of the fetus begins or where it ends. The calves that are born, apparently at full time, in herds where the ravages of disease are high have considerable trouble as a rule in their early lives, and when they reach maturity infection makes itself manifest by shy breeding and the necessity of repeated services before conception. It seems, to the best of our present-day knowledge, that unless we breed healthy males to healthy females our troubles may be endless. If we are to control breeding diseases and aid in the reproduction of healthy cattle we must take into consideration all factors which may cause nonconception, and not only those which might cause the recognized expulsion of the fetus.

The genital system of the female is composed of ovaries, oviducts, uterus, cervix and vagina (together with the mammary gland). Any deviation from normal in any one of these closely associated parts may in itself be responsible for nonfertility. We believe that with proper treatment we can alleviate disease to a marked degree from all of these parts except the oviduct. Experimental work has been done in recognizable salpingitis to remove entirely the oviduct and have the ovary function directly into the uterus. The results of this work to date have not been satisfactory. The extent of disease in the herd, character and nature of past treatment, degree of virulence of the infection, sanitation measures and potency of the males are important factors that determine the degree of success that may be attained.

The majority of the more persistent cases of nonbreeders are suffering from either cervicitis or salpingitis. Numerous cases

of cervicitis have responded more readily to treatment by using a 1 to 2 per cent solution of hot chlorazene to dissolve the mucus throughout the cervix, followed by dressing with various iodine preparations, Lugol's, iodex, etc. Amputation of the cervix affords quick and prompt relief in many chronic cases, and oftentimes amputation of the rear or first fold brings relief.

The genital system of the male is composed of the testes, epididymes, vas deferens, seminal vesicles, the prostate, Cowper's glands and the penis. Inflammation of the testes and epididymes is not uncommon. Many times an inflammation of the seminal vesicles is recognizable. Slight abnormalities of these portions of the tract may produce any degree of lessened potency. Bulls so diseased have proven very disastrous in some herds. After the removal of diseased bulls and the treatment of females which they have apparently infected a new and normal herd sire will greatly reduce the number of services per conception and the recognized abortion rate.

In beginning our work in the control of breeding diseases it is essential that we obtain considerable history of the breeding operations at the farm. As a rule, especially at well-organized farms, we can learn the number of calves, the number of recognized abortions, the number of retained placentas and the number of deaths in calves apparently normal at birth. This will give us a knowledge of the general conditions as they exist before treatment begins. It is also important to obtain these data so that at the end of each year we may be able to compare the results of our work. Each cow, heifer and bull of breeding age in the herd is examined in detail. The notes are filled in in a loose-leaf health-record book. The outline followed is that originally suggested by Dr. Williams a few years ago, as follows:

Name or herd number of animal.....Date of birth.....
Has animal been pregnant?.....If she has bred, state number of calves produced .....
Date of termination of last pregnancy .....
Duration of last pregnancy in days.....Was calf alive or dead? .....
If living, was it healthy?.....Did cow have retained afterbirth?.....Or discharge from uterus?.....
Character of estrum, regular or irregular.....

Following this history we arrive at present status which includes:

General condition ..... State of lactation .....
Date of examination .....
Right broad ligament ..... Left broad ligament .....
Vulva ..... Vagina .....
Cervix ..... Uterus .....
Right ovary .....
Right oviduct .....
Left ovary .....
Left oviduct .....
Diagnosis ..... Prognosis .....
Treatment applied .....
Treatment advised .....
Remarks .....

There is nothing very new to offer in the line of treatment. The best methods per case will be found in the book about to be published by Professor W. L. Williams of Cornell University. There is therefore no need of going into a lengthy description of a few cases, as each case is an individual problem in itself.

After we know the condition of each female in the herd we try as nearly as possible to group them according to the conditions found; that is, pregnant cows, normal cows ready for service, cows under treatment, and those that are not of proper age. Condemned animals, which are to go to the butcher as soon as their milk supply diminishes to an unprofitable point, should be segregated; this last group may contain animals that are apparent spreaders of infection.

Our examination and notes include remarks relative to any abnormal condition found. On reexamination in two to four weeks such notes are made as refer only to the abnormal condition and the treatment. Every possible detail and precaution is taken in carrying out this work. Haste must be avoided. In this way the history and the present status of each breeding female in the herd is recorded. It is important that each female be examined, as oftentimes those that are thought to be normal by the owner are many times the cases which give us the most trouble. We find many cases of cessation of estrum in females thought to be pregnant. In some cases even after normal parturition the uterus will be atonic and contain considerable exudate. This in itself may prevent estrum and may lead to a more or less chronic infection. The female should be examined and treated if necessary as soon after calving as possible. She will then be ready for service as soon as practicable and often

before the owner is ready to breed her. If she is on test, in a few weeks she will be available for observation, and oftentimes an occasional examination and slight treatment may prevent much future trouble.

Our next consideration is the herd sire or sires. One of the leading gynecologists states that 40 per cent of sterility in the human family is due to the male. In bovines the sire is 50 per cent of the herd. Therefore, the part played by him is of great importance. We have numerous instances backed by clinical data showing the importance of eliminating diseased sires. Impotency in bulls may occur at any age. They may never have been fertile. A diseased bull may manifest nonfertility or decreased potency in different ways—by repeated service to apparently normal females without conception, by a high abortion rate in females that have previously been apparently normal, by characteristic infections following the use of any particular sire, and by abnormalities in the breeding tract noted by rectal and physical palpation.

Microscopically, disease is manifest by abnormal semen and sperm cells. Bull No. 10, a three-year-old Holstein, was used in service on 48 females; all but 2 conceived the first year. The 2 females which did not conceive were recognizably diseased. The following year 2 animals became pregnant to him. At the time of our examination he was completely sterile. Conception followed in all other females to a normal bull. There was apparently no disaster following his use as a herd sire. The cause of sterility in this bull was apparently some derangement in the germinal cells of the testes, all sperm cells being nonmotile and immature. The seprmatic fluid was free from bacteria.

Bull No. 7 has been used for a period of eight months on 43 females; of these 1 was pregnant. As there were 4 other bulls on the farm, I am sure that this fellow was not entirely responsible. This bull is still alive and still infertile and probably always will be. His testes have recently become atrophied and his seminal vesicles enlarged. Many of the remales repeatedly bred to this bull on examination revealed a characteristic cervicities and endometritis. A large majority of the animals responded to treatment and conceived to other bulls. On the original microscopic examination of this bull the sperm cells were but slightly motile and all were malformed.

Bull No. 19 is a 15-months-old bull bred to 12 imported and 3 domestic heifers, making a total of 15. All females were of an approximate age and all were bred within two weeks and were turned to pasture after breeding. It was noticed when the herdsman began to watch for their return to heat that a number of them were discharging.

On our examination a few weeks later the heifers had a marked purulent vaginitis, with the exception of one domestic heifer. Six of these imported heifers conceived at this first service, although they continued to discharge even under treatment for two months. The other heifers responded slowly to treatment, and with one exception, which was incurably sterile, suffering from salpingitis and pavilionitis, all conceived. We do not know whether or not this one case was due to infection from the bull, because we had not had an opportunity to examine this female prior to this general trouble. On microscopic examination of the bull the sperm cells were normal, but on check bacteriological examination a streptococcus was isolated, very similar to bacteria which had been isolated from the oviducts from sterile cows from the farm from which this bull was purchased. It remains to be seen how many of these six heifers will produce healthy calves. This bull was withheld from service, given proper exercise on a tread power to increase his health and vigor, properly fed, and because of his particular breeding he was not slaughtered but treated with autogenous bacterins for two months. At the end of this time he was placed in service to a grade nurse cow. No apparent bad effects followed the service and pregnancy resulted. After proper bacteriological examination is made, if deemed advisable, he will be bred to a few females, and if no disastrous results follow he may be returned to service.

Bull No. 26 had a history of no calves for the past few months with a high abortion rate in the few females that previously conceived. He was sexually so diseased at the time of our examination that a sample of his semen could not be obtained. His seminal vesicles and epididymis are recognizably inflamed and enlarged. He was removed from the herd and slaughtered.

Bulls that prove to have a lessened potency should be used with moderation. They should be examined every few months.

If their potency decreases, as manifested by decreased breeding efficiency and microscopical examination, they should be withheld from service entirely. It is an important factor in these cases of lessened fertility that they receive proper food and sufficient exercise. They should be in good vigorous condition but should not be fat. At several farms we have had tread power machines installed. They are using them daily, and from the results obtained in several cases we are prolonging the breeding life of these animals considerably. As far as the specific treatment of these cases is concerned, we do not know of anything at the present time we can say that is of value. We have some experiments in hand by way of treatment that seem promising of results. Should these results warrant, the complete data will be presented later.

Our complete examination of bulls is recorded according to the accompanying outline:

BULL EXAMINATION CHART

Name of bull ..... Case No. .....
Breed ..... Date .....
Date of entering herd ..... Born .....
Owner .....
Address .....

A. Breeding history:
1. Extent of previous service .....
2. No. of calves born .....
3. No. of individual cows served in herd .....
4. No. of services: Maximum per day ..... Per month .....
5. No. of pregnancies per month .....
6. No. of known abortions .....

B. First evidence of sterility:
1. No. of known apparently normal females served .....
2. No. of services .....
3. No. of pregnancies .....
4. No. of cows bred which conceived on subsequent service to another bull .....

C. Status præsens:
1. Exercise .....
2. Ration .....

a. Physical examination:
1. Penis .....
2. Testes .....
3. Epididymes ..... Head ..... Body ..... Tail .....
4. Vas deferens .....
5. Seminal vesicles .....
6. Prostate .....

b. Intercourse:
1. Vigor .....
2. Orgasm .....
3. Protrusion .....

c. Semen:
1. Amount .....
2. Consistency .....
3. Color .....
4. Bacteriology .....

d. Spermatozoa:
1. Number .....
2. Activity .....
3. Morphology .....

D. Remarks .....

We try to bring our calves into the world in a clean way, raise them under the best conditions we know, and breed them only to females which, from all clinical evidence, are sexually clean. All bulls are properly douched before and after service. I firmly believe this is a great help in reducing certain types of herd infection.

Many of us may not be situated in localities where there are at the present time purebred breeding establishments. You might think, therefore, that you have no call for this type of work. In grade dairies where the income is almost entirely from the sale of milk it is just as important, so far as the income is concerned, that they have a good yearly crop of calves as in the purebred herd. Let us consider, then, breeding diseases from an entirely commercial standpoint.

Herd supervision by veterinarians in these more commercial dairies, if properly carried out, is a profitable investment for the owner. Due to the high prices of feeds, labor, etc., the dairy cow of today, in order just to pay for the place she occupies in the dairy, must produce at least 20 pounds of milk daily. The profitable grade cow must maintain at least a 50 per cent increase or 9,000 pounds of milk per year, exclusive of the two months which precede the date of parturition, and she must produce a calf every 12 to 14 months. We are all familiar with the ravages of disease which impair reproduction in the larger dairies, especially where no methods of sanitation and control are carried out. Oftentimes it will be found that instead of producing a calf each 12 to 14 months the average is 16 to 18 months and in some cases longer. The female of this type then falls greatly below her maintenance supply of milk; she becomes an expense and counterbalances a good producer that may stand beside her.

Many dairymen do not stop to consider why their income

from the number of animals they are maintaining is not larger. They seldom realize the number of boarders they are feeding and caring for. The veterinarian should familiarize himself with problems of this kind and be of assistance to the producer by eliminating the unprofitable animals and advise about those that will soon be unprofitable. Breeding sanitation should be practiced and the individual cases handled according to individual conditions. I will endeavor to formulate the general plan that we carry out with success in dairies of this type that come under our supervision.

Our aim in this work is to arrange the breeding so as to have a uniform number of cows freshening each month, with a few more than the average for the months of July, August, September and October, the most difficult months of the year in this locality to produce milk.

Our first procedure is an examination of each animal with a report in the form shown herewith:

Farm..... Date.....

Cow No.	Milk daily	Date of last calf[1]	Last breeding	Present status[2]	Due to freshen	Remarks

[1]N=normal; A=aborted; R =retained placenta.
[2]P=pregnant; PP=possibly pregnant; NP-N=not pregnant, normal for breeding; T=treating.

This tabulation will enable us to know the exact breeding status and milk production of each female each month. If these data, including production, last calving date, date due, etc., are not obtainable, we have to proceed with the information the present caretaker can give, plus existing manifestations, and explain to the owner or caretaker the importance of keeping sufficient records. Milk production charts should be obtained if not already in use, and the daily production of each cow should be recorded.

Our records are kept in a loose-leaf health-record book in which each cow is given a number and a separate page. Cows not in calf are listed, note is made if they are normal and ready for service or if treatment is necessary and what treatment was and is to be given. Of the cows ready for service the poorer producers and short-time animals should be bred first, arranging as near as possible the breeding so that a proportionate number of the herd will be bred each month. The cows that are normal and ready to breed as the proper period approaches are then placed in adjacent stanchions so that they may be more closely watched. They should be turned out for an hour or two each day if possible. This is quite important, especially where cattle are not turned out regularly, as their heat periods may pass unnoticed and thus cause further delay in our breeding work.

The other animals are stanchioned or stabled according to pregnancy, and the treatment is the same as in purebred herds if this can be carried out conveniently. The health record book is posted at our visit, and each night or once each week the owner or herdsman records heat periods, calving dates, premature births, retained placentas, discharges, etc. We can therefore get a brief history of each case without much difficulty and without consuming too much of the owner's time on our visit.

No animal is bred until approved, or until she is clean, normal and ready for service. Many times a separate list of cows to be bred during the month is made, so that there will be no error in breeding females other than those that are apparently normal.

One man is made responsible for all breeding work, including heat dates, dates of service, calving, douching the vaginas of the cows and the sheaths of the bulls.

Work of this kind has proven its value in grade herds. One dairy composed of 125 milking females came under our supervision about 18 months ago. By this method of handling and eliminating the unprofitable cows and with the proper treatment of diseased animals more cases of milk have been produced by this farm during the past nine to twelve months than ever before in the history of the herd from the same number of animals.

The previous year's breeding ratio of 4 services per pregnancy has been reduced to 1.3 services to 1 conception with the use of the same 2 bulls. These bulls were apparently in every

way efficient and healthy on our examination. The breeding ratio per calf is a saving of over three months' time on each calf produced. The abortion rate has been reduced to less than 3 per cent.

Calf raising on many farms is at times a very serious problem. As a rule where the percentage of premature births, retained placenta and metritis in its different forms is high, so is the ratio of calf disease very high, including septicemia, pneumonia, diarrhea and digestive troubles. Very little work has been done by investigators along these lines, although today death from these causes ranks high in the proportionate losses of each herd. Several methods are used in feeding and raising calves. It apparently makes no difference how they are fed, provided they are sturdy, vigorous and comparatively free from infection. Many farmers and herdsmen say that they never have any "particular trouble," but if any of these collective infections once gain a foothold he will realize how little he knows about handling these cases. One of our first considerations is the proper sanitary condition, proper stalls, ventilation, cleanliness of the udders of the cows, the utensils used in feeding and storing the milk, etc. After we have checked up on all such conditions we look to the general handling and feeding of the calves.

Professor Williams, after much study, decided on a definite plan for rearing calves. The plan is to remove the calf at birth from its dam, give 30 mils of calf scour serum daily, an enema at birth to remove the meconium, proper care of the umbilicus, and if diarrhea sets in alkaline or weak antiseptic enemas as indicated. All food is withheld for 24 hours, after which time 2 per cent of the body weight in milk is fed twice daily for a few days, gradually increasing the milk as the calf properly digests this and does not evidence any digestive disturbance or a rise in temperature. If the calf's temperature rises above 103° F. and diarrhea sets in, all milk is withheld and 30 to 60 mil doses of calf scour serum are administered and enemas given until temperature drops below 103. The milk is then resumed and the amount increased as the calf can assimilate it without causing another setback. Autogenous bacterins in small doses beginning a few days after birth apparently give some aid in overcoming the infection. I personally believe that where our

infections are very severe, where we have the proper man handling the cases and he does not care how thin his cases get until they are once started, it is a very good plan.

We have had considerable trouble with this calf question on some of the farms under our control. We tried to work out a plan the basic principle of which was suggested by Dr. Frost previous to a paper he gave on the subject at Ithaca. We finally outlined a plan as near to Nature's way as possible and with the least possible amount of work and routine required by the caretaker in carrying it out. Our plan is as follows:

1. Prepare the cow for calving.
   (a) Clip tail and udder.
   (b) Seven days before calving thoroughly wash and scrub the hindquarters, tail, udder, genitals, etc., with soap, water and brush. Rinse with clean water and dry.
   (c) Sponge hindquarters, tail and genitals daily with a mild (1 or 2 per cent) disinfectant of lysol, creolin or some other good product.
   (d) When about to calve remove to disinfected stall in which there is clean, dry straw.
2. Dip the navel and cord in iodine daily for three days.
3. Allow the calf to nurse its dam or a safe "nurse cow" at will for four to eight weeks.
   (a) If the cow is to go on test and the calf is to be weaned soon, allow it to nurse its dam for three days. When weaned feed in sterile pail and use the first portion of the dam's milk three or four times per day, depending on the number of times she is milked. Continue this feeding for eight to ten weeks. After ten weeks, if desired, gradually change to heated milk, either whole or skimmed. Bring the milk to a boil and allow to cool in a natural way under cover. Feed at 96° to 100° F.
4. Provide a temperature card and take and record the temperature three times a day (morning, noon and night) for a week to ten days.
5. If the calf develops a temperature of 103° F. and appears sick, remove to adjoining stall and reduce the feed. Inject 15 c.c. of serum every three hours. On the following day inject 30 c.c. of serum morning and night. As soon as the temperature develops and calf appears sick give 1 quart of warm water containing 1 heaping tablespoonful of soda bicarbonate and 1 teaspoonful of aromatic spirits of ammonia morning and night one hour before feeding. Subnitrate of bismuth in 1-ounce doses and salol in dram doses (60 grains) or saola in 1-ounce doses may be given as indicated 3 times daily.
6. As soon as calf shows symptoms of sickness, acid feces and scours, discontinue milk and substitute 1 pint to 1 quart of warm barley water 3 times daily. Continue serum and give stimulants as indicated, and resume milk ration when acidity subsides and feces become normal, as soon as calf can take it with safety.
7. When feces become normal gradually discontinue soda bicarbonate and aromatic spirits of ammonia and resume normal feeding.

Barley water. Take 3 quarts of ground barley; place in a 10 or 12 quart pail, and add boiling water until the pail is nearly full.

Stir for a few minutes and allow to settle and cool. Pour off the clear fluid and use as directed.

From this method of handling we have been and are getting good results. One point especially where our calves are having some trouble is to feed a uniform per cent of butterfat in their daily milk. Frequently even older calves can not utilize all the butterfat in Guernsey or Jersey milk, especially where there is digestive disturbance or weakness. As soon as the calves are weaned from their dams or nurse cows they should be fed for a few weeks a thoroughly safe, pasteurized milk standardized to about 2 per cent fat. When they are growing well and get a good start gradually substitute pasteurized skim milk with suitable grain and roughage diet.

Hemorrhagic septicemia is more prevalent in some localities than has been previously recognized. On all calves at farms under our supervision, if any individual shows a rise in temperature, cough, increased vesicular murmurs, it is immediately given a dose of hemorrhagic septicemia bacterins plus serum. Daily doses of serum are given until recovery seems assured. All calves in the herd not having temperature are given the bacterin. In this way we have been able to check apparent outbreaks without the loss of a case, whereas in previous epidemics at some farms we lost a number. Experience has taught us not to wait until we have several calves sick with pneumonia, but to start with our bacterin and serum just as soon as our original case is found. Symptomatic treatment is given as conditions warrant.

After our calves reach the age of six weeks, we believe they are out of most danger, although this is not always the case. When the feces mature they are penned according to size and sex. They are grown with the aid of the calf ration previously mentioned, with fine leafy hay and skimmed milk, the quantity depending on size and age. In other words, they are grown rapidly so that they may be as large as possible when 15 to 18 months of age. A well-grown animal of this type can be bred or used for service much earlier than the animal fed on a limited ration. This will enable them to freshen, barring disease, at 25 to 28 months of age. In this way we will be getting an early income from the new generation.

Herd efficiency should go hand in hand with the increased

value of livestock and better animal husbandry. Herd efficiency is dependent on the control of disease, maximum production and reproduction. Dairy sanitation, breeding hygiene, normal genitalia and the mating of sound individuals are milestones along the road to success. The three most important points are: Proper attention to all breeding females by way of cleansing the genitals after parturition; careful manipulation and examination of ovaries, uterus and external genitals before breeding; with the bull, proper douching, feeding and exercise. Only sound, vigorous and prepotent sires should be maintained in a herd. Strong, healthy, well-grown calves should result. All of these are conducive to better livestock and better agriculture.

THE INTERNATIONAL ANTHRAX PROBLEM

At the international labor congress in Geneva, Professor Armstrong, Australian employers' delegate, according to the London correspondent of the *Journal of the American Medical Association*, submitted a resolution that the committee considers that the question of the universal and compulsory disinfection of wool and hair infected with anthrax, in its humanitarian aspects, has not yet been sufficiently studied to justify the conclusion of an international convention; that the conference should request the governing body of the international labor office to appoint an advisory committee to which the government of France, Great Britain and Germany, as representing the users, and Australia, India and South Africa, the producers, should be invited to send representatives, and that this committee should be invited to examine the question in all its bearings and present its report to the conference in 1923; that the chairman of the proposed advisory committee should be appointed by the British government; that the inquiry should at first be mainly by correspondence; that when meetings of the committee become necessary, they may be summoned by the chairman in London, and that co-operation of a representative from the United States be invited. While accepting disinfection as the only effective means at present of protection of workers, the committee regards the eradication of the disease among animals as the ultimate solution, and is of the opinion that the advisory committee should be instructed to report on this subject.

TRIBUTE ON BEHALF OF McGILL VETERINARY GRADUATES TO DEAN McEACHRAN [1]

By W. REID BLAIR

New York, N. Y.

IN ACCEPTING the honor of representing Dean McEachran's "boys of the Old School" on this occasion I did so with feelings of misgivings, since I fully realize my limitations to express adequately my own feelings, to say nothing of those of my colleagues. I wish I might have had the training of a lawyer to aid me in this task. Every man has wondered some time in his life where his lawyer friends get all their words, many of them useless and superfluous perhaps. The difference in speech between the ordinary human being and a legal luminary is illustrated by the following: If a man were to give another an orange, he would simply say: "I give you this orange." But when the transaction is entrusted to a lawyer to put into writing he adopts some such form as this: "I hereby give and convey to you, all and singular, my estate and interests, right, title, claim and advantages of and in said orange, together with its rind, juice, pulp and pits, and all rights and advantages therein with full power to bite, cut and suck, and otherwise eat or give the same away, with or without the rind, skin, juice, pulp or pits, anything hereinbefore or hereinafter or in any other deed or deeds, instrument or instruments of whatever nature or kind whatsoever to the contrary in any wise notwithstanding." But what I may lack in verbosity I hope to make up in expressions of loyalty and good will.

It is indeed a happy augury to note the growing tendency to honor our men who have distinguished themselves in whatever field they may have labored, during their lifetime, rather than to wait until our friends pass over the silent river before expressing our appreciation of their services to our profession. It was with this thought in mind that the gathering tonight had its chief inspiration.

Dean McEachran, the men gathered here tonight truly represent that great body of "your boys," scattered throughout

[1] Remarks at a complimentary dinner to Dr. Duncan McEachran at the Ritz-Carlton Hotel, Montreal, Canada, October 13, 1921.

the world, and they come for the express purpose of registering their appreciation and esteem for you, and to testify to the fact that you, too, had an important part in establishing McGill's fair name at home and abroad. While the school which you founded and presided over for so many years is dead, still we wish you to know that the work which you and your colleagues began, more than half a century ago, will continue to stimulate others to greater effort in extending the principles for which you ever contended, in the prevention and control of infectious diseases.

To have that faculty to inspire a body of students for a long term of years is certainly an achievement which implies the possession of more gifts than one. These must be personality supplemented by solid attainments. And then to magnetism and knowledge must be added that ungrudging eagerness to be helpful, which renders the teacher capable of maintaining discipline at all times. It is through the possession of all these qualities and attainments that Dean McEachran has endeared himself to his students and communicated to them his own high sense of that standard which should guide the practitioner of veterinary medicine. Dean McEachran never looked upon the work of the classroom as a task, but rather as an opportunity for imparting his own zeal and wholeheartedness, along with his rich store of learning.

The institution over which our honored guest of this evening presided for thirty-seven years consistently endeavored to reach and maintain a high standard of veterinary education, and it was a matter of deep regret, not only to its many graduates, but to all those interested in veterinary science on this continent, when, largely through lack of financial support, it was compelled in 1903 to close its doors.

It would be hard to overestimate Dean McEachran's influence for good in the maintenance of the friendly relations between the members of our profession on both sides of the international boundary. Many American graduates can testify that it was no handicap to have it known that they were graduates of Dean McEachran's school of McGill University.

Dean McEachran was able to impress his ideals and aspirations upon the undergraduates from the first moment of his contact with them. The hold which he gained at the outset he has

preserved unbrokenly, until, with an ever-widening range of effectiveness, his graduates have carried his honored name and influence to all parts of the world.

His graduates have distinguished themselves in all human endeavors, in war as well as in peace, as administrators, teachers and practitioners. Many have become distinguished practitioners of human medicine, and in a great measure their success as diagnosticians can be attributed to their prior study and practice of veterinary medicine. Many of his graduates in administrative capacities have brought zeal and intelligence to bear in sanitary affairs, and have over and over again demonstrated what veterinary science can do to safeguard the health of our stock and the people alike.

It is generally conceded that the value of scientific discoveries and deductions is largely dependent upon their authorship. When new results are brought to our attention the first inquiry is for the name of the author, and several factors enter into our judgment of his work; but the primary consideration is the man. Unripe minds will naturally produce pseudo-science, and much so-called science is being forced upon our attention today that is unripe and undigested.

In these days of fortune making and of chasing the almighty dollar we need a renaissance of the spirit which inspired and upheld the fathers of our profession in their strenuous labors, both scientific and practical, that have laid the foundations of modern veterinary medicine.

We sometimes hear in these days of men who look upon the present and future veterinarian with gloom; but what must have been the hardships and discouragements of such men as Dean McEachran, Liautard, Law and Smith in combating the influence upon the minds of the people of their day of such imaginary diseases as "wolf in the tail" and "hollow horn," when every community was infested with ignorant "hoss doctors" with their cure-alls for real and imaginary ills of the animal kingdom?

One can not contemplate the development of the institutions that these men founded without a feeling of admiration for their achievements and a conviction that the phase of education which they typify is destined to become more and more important in America.

It has been my good fortune to have known each of these men, to have known something of their ambitions and aspirations to protect and serve the livestock interests of our countries, and to have been thrilled by the kindly inspiration of their eventful lives. Each of these men laid stress upon the thought that the field of veterinary medicine is not a commercial one, but one of service in promoting and protecting the livestock interests of the community. The names of these men by their achievements are indelibly written in the records of the progress of veterinary medicine. Time has indorsed their early judgment in regard to the necessity for rigid inspection and quarantine laws, for the protection against infectious diseases among horses and cattle, and particularly the need for dairy laws for the protection and assurance of a wholesome milk supply for the general public. While these laws were often bitterly opposed in the beginning, time has shown the beneficial wisdom of them, and they are now universally acknowledged.

While the older practitioners had their problems, dealing with quackery and ignorance, the veterinarian today is frequently confronted with problems of vital importance to the good name of our profession. Not infrequently the young veterinary practitioner starts out in practice as a specialist by aping that real pest of the medical profession who opens spacious and elaborate offices and waiting rooms with nurses and attendants, and an all-pervading glitter of white enamel, mechanical novelties and shining metal work, in an attempt to impress his clientele by costly stage effects. He seems to forget, and his clients still oftener fail to realize, that what he really has for sale resides in his own cranium, and that mere style, atmosphere and scenery are poor substitutes for knowledge, experience and technical proficiency. The really conscientious veterinarian's regard for his good name and high personal character should be, and is usually, quite as dear to him as his professional reputation.

To those who feel pessimistic at the outlook for the veterinarian of the future, I would recommend the study of the lives and achievements of that splendid group of pioneers who came to this continent some 55 or 60 years ago, to become the founders of veterinary education in America. With what amazing industry, versatility and keenness of intellect did they unfalteringly cultivate the field of veterinary science! With what devo-

tion and beneficial results did they give of their time and abundant knowledge to the service of the public and of the profession! It is due to the work of such men as Dean McEachran that the public has been convinced that the veterinarian and the veterinary profession are entitled to a better position in the public mind. And now we all realize that the public is willing to accord to the veterinarian and the veterinary profession the position which they demonstrate their ability to occupy. It lies within the province of each veterinarian to decide whether he is to practice veterinary science as a profession or merely as a trade.

Let us then look with pride upon the achievements of the past, and face the future with courage and hope that the profession will yet attain that state of perfection where it is universally recognized as truly scientific, a benefit to mankind, and also indispensable in its economic importance to the general welfare of a progressive citizenship.

DR. ALBERT HASSALL HONORED

Dr. Albert Hassall of the Zoological Division of the Bureau of Animal Industry has recently been notified that the Steel Memorial Medal for 1921 has been awarded to him by the Council of the Royal College of Veterinary Surgeons. This medal is awarded at intervals of 3 years on the recommendation of the Honors and Prizes Committee as an award for scientific or literary work of merit in connection with the veterinary profession.

Dr. Hassall has been in the Bureau of Animal Industry for the last 35 years, and in the course of that time. in addition to publishing numerous papers on parasitology, has built up an Index Catalogue of Medical and Veterinary Zoology which is the most complete work of the sort in existence. The author catalogue was published as a joint work of Dr. Ch. Wardell Stiles and Dr. Hassall as Bureau of Animal Industry Bulletin 39, and the subject catalogues, covering the cestodes, trematodes and nematodes, have been published by these authors as bulletins of the Hygienic Laboratory, U. S. Public Health Service. These publications constitute very valuable reference works which are in great demand in this country and abroad by zoologists, veterinarians and physicians.

ADDRESS AT McGILL VETERINARY REUNION[1]

By DUNCAN MCEACHRAN

Emeritus Dean and Professor, Late Faculty of Comparative Medicine, McGill University, Montreal, Canada

IT IS UNNECESSARY for me to say that I had much pleasure in accepting your kind invitation to be present here tonight at this great festival of graduates of McGill. It always gives me pleasure to meet old friends, especially old pupils, under such happy circumstances as have brought us together tonight. It is well known that the Macs are all clannish, and it would not have surprised me a bit if in this gathering of the sons of Old McGill some one had got up and asked us to drink that very old but extremely modest toast, "Here's to oor ain sel's—wha's like us?"

I remember on a former occasion I attended a somewhat similar gathering, though on a smaller scale, on the 19th of January, 1896, which was reported at the time in the *Boston Globe* as follows:

"One of the most enthusiastic and enjoyable occasions and one of the finest sets of men to meet in Boston was the Massachusetts alumni of the Department of Comparative Medicine of McGill University which met at the Quincy House last night. They were all healthy, hearty looking men." Then followed some personal remarks about myself, so flattering that my Scotch modesty prevents me from repeating them. You must imagine them. Then followed a reference to "the ease and dignity with which he carried his years." (I was a young fellow then, and I am not an old fellow yet. That reporter should have known how easy it was to be easy when being entertained in Boston.) Twenty-five years ago, the report went on to say that "the respect which his 'children,' as he called them, showed him was pleasant to see."

If I mistake not, I believe that association, which had been in

[1] This is Dr. McEachran's response to addresses by Drs. V. A. Moore and W. Reid Blair at a dinner given in his honor at the Ritz-Carlton Hotel, Montreal, October 18, 1921, by former graduates and the late Faculty of Comparative Medicine of McGill University, during the McGill centennial celebration. A report of the dinner was given in THE JOURNAL for December, 1921, page 388. Dr. Moore's address was published in THE JOURNAL for February, 1922, page 625, and Dr. Blair's appears in this issue.

existence for several years before that meeting, was the first society of McGill graduates in Massachusetts. As a matter of fact such meetings were held by the graduates of the Montreal Veterinary College years before we became a Faculty of McGill.

It is very gratifying to meet tonight such a representative gathering of graduates, many of whom traveled more than 2,000 miles to do honor to their Alma Mater, represented by my humble self. How true it is that history repeats itself. That reporter if present tonight would compliment himself on his true realization of the quality of the men of whom he wrote twenty-five years ago.

Institutions of learning may be built, equipped and endowed by the large-hearted liberality of benefactors, yet if their graduates forget their duties to Alma Mater enduring progress can not be made. I am not going to presume to lecture in this after-dinner speech on these duties, yet one can not help taking advantage of such an opportunity of speaking to such a representative gathering as this, to say a few words on this subject. Graduates should feel that they are part of the University, that they ought to continue to take an active interest in her affairs and have their views on all important matters properly expressed by their representatives. Each individual graduate should ever keep before him the feeling that his professional standing, his research work and contributions to science reflect credit on his college.

I was asked once by a former Chancellor of McGill, Lord Strathcona, for my opinion as to what was the stimulating influence that impelled the young Scotchman to get on in the world. My reply was: "His love for his parents, especially his mother, the great joy she would feel in his success in life, and his desire to contribute of his earnings to the support and comfort of those who did so much for him." Such feelings should actuate every graduate to give Alma Mater joy in his success, and to promote her progress in some of the numerous ways which circumstances open to him.

Referring to "Old McGill"—the prefix "old" is in one sense at least no longer applicable. The visitor to McGill who has not been there for ten years will be amazed at the newness of everything. Noble piles of new buildings, thoroughly equipped laboratories, well-stocked libraries and other essentials of uni-

versity equipment; the number of professors, lecturers and demonstrators has been greatly increased, especially in the medical, arts and applied science faculties and agriculture. The Medical College has been rebuilt and enlarged, and now without doubt it is one of the most complete medical colleges on this continent, thanks to the princely liberality of her numerous benefactors. Much, however, yet remains to be done to make McGill as complete as we hope to see her become. Surely the day is not far distant when the branch of the medical science which deals with the prevention of disease in food-producing domestic animals, on which public health so much depends, and which affects materially one of Canada's greatest commercial industries, will be restored and endowed in such a manner as will enable the Faculty of Comparative Medicine to carry on its work in a manner proportionate to its importance scientifically and practically. I can not refrain from remarking that one of the greatest blunders ever committed in the management of McGill University was allowing that Faculty to close its doors for want of necessary financial support. However, we will "let the dead past bury its dead," and hope that some day the blunder will be remedied to the University's own advantage.

Think of the good work so well done and so much appreciated by the whole United States as is done by Cornell University. It is surely a great honor to us for Cornell to send as her delegate the able head of her veterinary faculty to represent her at the great McGill Centennial now in progress, and more especially to deliver the able address to us to which we have just listened.

The importance of comparative medicine and the value of comparative research work to medical science are well understood today and were well illustrated in 1901 at the British Congress on Tuberculosis, of which I had the honor of being a vice-president, when Prof. Robert Koch in the section of animal diseases, injudiciously and unsupported by sufficient data, announced that "tuberculosis could not be transmitted from man to animals or vice versa," throwing the whole medical world into consternation in view of the unanimous concurrence in the belief among medical and veterinary scientists generally that the commuication of bovine tuberculosis by means of milk especially, and also by flesh, was responsible for the prevalence of consumption in human beings, a belief which constituted the very basis of the

congress. Who, let me ask, were called upon to combat his announcement at that historical assembly of medical scientists, comprising as it did nearly 3,000 members representing every civilized country in the world? First that great luminary in medical science, the chairman, Lord Lister; following him the late Prof. Nocard, the leading veterinarian of France; Prof. Bang, at the head of the veterinary profession in Denmark, and Prof. McFadyean, Dean of the Royal Veterinary College at London.

I will not detain you further with the subject, but would call your attention to a paper containing most advanced ideas and logical reasoning entitled "Knowledge and Practice," by the esteemed Harvard professor, C. S. Minot, in which he says: "Medicine is destined to become comparative because it must advance. The wise action for us is to facilitate that advance." And I would also call your attention to an equally advanced discussion of the same subject by another illustrious Harvard professor, Theobald Smith, entitled "Comparative Pathology: Its Relation to Biology and Medicine," in which he says: "The economic as well as scientific importance of animal diseases is so great that the National Government could with profit maintain a trained expert for every one of the plagues that decimate our domestic food-producing animals. It could afford to give him all the facilities for experiment and study and travel necessary to keep our knowledge of that particular disease in this and other countries up to the high-water mark of medical science."

An admirable address by the late Rt. Hon. Joseph Chamberlain, delivered as Chancellor of the Birmingham University, showed that Mr. Chamberlain was not only able to guide the affairs of state as he did in connection with the South African rebellion and to defend himself against the attacks of foreign politicians, but to formulate university policy on the broadest lines, and a clear appreciation of what an up-to-date university ought to be. Mr. Chamberlain knew the high ideals of university work, university aims and standards which were suitable for the state of society a hundred or hundreds of years ago, when few entered their precincts but the sons of noblemen and men of wealth and property, and even in Britain today where their halls are largely filled from the families of wealthy landed proprietors, millionaire capitalists and rich merchants; but he knew

that we are living now in a utility age, an age when the sons even of millionaires are brought up to some business or profession by which they can earn their living; an age when it is honorable to work and dishonorable to eat the bread of idleness; hence Mr. Chamberlain's sound common sense suggested to the Senators of the new University to "start with the belief that here we are going to combine theory with practice and to see that in our University we shall combine both in one course of instruction with due regard to the needs of our time and district."

In visiting several of the universities of Continental Europe I was particularly impressed with the excellent opportunities students enjoyed for combining with the higher branches of learning a thoroughly practical course of instruction to prepare them for practical life work. For this reason graduates of British and American universities have flocked thither for post-graduate work. It is to be hoped that the day will come when McGill will establish post-graduate courses which will attract not only her own but graduates of other universities as well.

Gentlemen, in conclusion let me say that your own Faculty of Alma Mater, as you all know, was based on similar high ideals as recommended by these noted men, as far as possible for us to combine scientific instruction with practical work, and to this I attribute the gratifying success of each one of this large gathering.

When I undertook the organization of a veterinary school, suggested by McGill's greatest scientist and Principal, the late Sir William Dawson, Major Campbell of St. Hilaire, then President of the Board of Agriculture for the Province of Quebec, through their influence Dr. George Campbell, Dean of the Medical Faculty of McGill University, and member of that Faculty, became much interested, and arranged for lectures to commence in their own lecture room in Cote Street. Without the assistance of the Medical Faculty we could not have even attempted a beginning. It is needless for me to say how I appreciated their aid, especially from the Professors of Chemistry, Dr. Girdwood; Physiology, Dr. Fraser; Dr. Craik, Dr. Mills, Dr. Osler, Dr. Wilkins, Dr. James Bell, Dr. Blackader, Dr. Ruttan, Dr. Drake, Dr. Stewart, Dr. Morrow, Dr. Adami and others. I look back with pleasure and satisfaction on my association with these professors, as well as with Dr. Baker, Dr. Charles Mc-

Eachran, Dr. Lyford, Dr. Bruneau, Dr. Daubigny and other members of the veterinary profession and of our own staff.

Let me conclude by thanking you for this crowning compliment of my life, for which I can not find language adequately to express my feelings of appreciation.

MEXICAN DAIRYMAN BUYING HOLSTEINS IN CALIFORNIA

A new market for California Holsteins is opening in Mexico, and buyers are canvassing the San Joaquin Valley, which they believe has the nearest climate to that below the border, for purebread and high-grade cattle. Carlos Arizao is at present in Stanislaus County, dealing with the Holstein Breeders' Association for a large number of cattle. He is asking for about 40 or 50 heifers a month for six months, and 5 or 6 registered bulls for each month's lot of females.

Arizao reports a great shortage of dairy cattle in Mexico, and says California must be looked to for the supply, as Eastern cattle do not acclimate well in his country, becoming subject to the pests peculiar to Mexican cattle. He is taking out a carload of heifers and bulls as a trial, and if they do as well as he expects, he will follow this order with many more. He believes Mexico will furnish an outlet for all the Holstein cattle California can produce in the next five or possibly ten years. —*Sacramento Bee.*

Statistics of livestock in Germany on December 1, 1920, show increases in all kinds during the preceding year. There were 16,789,844 cattle, a gain of 472,516, and 3,581,380 horses (not including cavalry horses), a gain of 116,146. Hogs showed an increase of 2,631,587, sheep 798,772, and goats 311,862.

The Belgian Ministry of Agriculture has arranged to give a series of free public courses in horseshoeing in 1922. The courses are in charge of official veterinarians and will be held in twenty-four localities. Certificates will be issued to persons who pass a satisfactory examination in theory and practice. The Government has a regular school of horseshoeing at Brussels.

DEDICATION OF NEW COLORADO VETERINARY HOSPITAL [1]

By GEORGE H. GLOVER

Colorado Agricultural College, Fort Collins, Colorado

"A consummation devoutly to be wished." It has been consummated; the first of the permanent buildings for the veterinary college is completed. The veterinary hospital and anatomy laboratory, which so long dwelt in the realm of the imagination, is at last a reality. It has been built for a specific purpose, and conforming in every detail to the needs of the special work for which it was designed, it can never appropriately or conveniently be used for any other purpose. For this reason the dedication of this building for the special work for which it was designed is altogether fitting and proper. It can best be dedicated to the conservation of the animal wealth and the public health.

In making the following abstract statements, I have no fear of successful contradiction. Real wealth comes primarily from the soil. Animal husbandry is the major part of agriculture. We are losing five per cent or more of our animals from disease. Microbic diseases are every year becoming more formidable. Eternal vigilance is necessary to guard the animal food supply of an ever-growing population. Many diseases of the lower animals are communicable to man. Inspection of foods for human consumption, more especially meat and milk, is in its incipiency. Less than one-half of the meants consumed in this country are subject to any sort of inspection. The public health should be of first consideration. This is naturally the work of scientifically trained veterinarians.

Human institutions are more or less transient and the history of nations "hath but one page." Things of human artifice may perchance survive one or many generations. Medicine, as a science and an art, is based upon the eternal verities. It must be as enduring as the present order of animal creation. So long as the life of one species depends for its existence upon the death of another, must animate creation suffer pestilence and the danger of extermination. The science of medicine is destined to

[1] Address at the dedication of the new veterinary hospital at the Colorado Agricultural College.

endure so long as there remains a human being to apply the art. In the realm of science, we have as yet scarcely scratched the surface of Nature's hidden secrets. In the practice of medicine empiricism is still to be reckoned with, and there is evidence on every hand of a lingering faith in the magic power of the mystic wand. However, it is doubtful if any similar epoch has witnessed a greater acquisition of accurate knowledge, respecting any branch of human endeavor, than has the science of veterinary medicine in the last two or three decades.

Veterinary medicine as a branch of one of the three learned professions had a tardy but auspicious beginning. It was born of necessity. It had its inception in the absolute need for organized and intelligent supervision and conservation of the animal wealth. Its early devotees in this country were remarkable men in many respects, and this was indeed fortunate, for a profession, like any other organized unit of society, is known by the company that it keeps, by the character of those who espouse its cause. These men gave this embryo profession a certain caste, an ethical, moral and social standing which has not been easy at all times to emulate.

The veterinary medical profession will ever honor and will never fail in its encomiums for Alexander Liautard, Duncan McEachran, Andrew Smith, D. E. Salmon, James Law and M. Stalker, the pioneers who "blazed the way." It was during the time of these men that the seeds of the veterinary profession were sown in America. The first seeds planted germinated in the environment of the private schools. The first veterinary colleges had many of the characteristics of trade schools. With meager educational requirements for matriculation, and with courses extending over two terms of six months each, the limited time must necessarily have been devoted to the art and not the science of veterinary medicine. Emphasis was placed on the how and not the why of things. The early colleges were privately endowed and were made to meet a popular demand. In the evolution of veterinary medicine, they blazed the way and filled their their niche creditably.

The first land-grant college to offer a course in veterinary medicine was the Iowa State College, under the able leadership of Dr. M. Stalker. There are now only 13 fully recognized veterinary colleges in the United States, and one of these is a

private school. The State colleges of South Dakota and Wisconsin have recently taken steps to inaugurate professional courses in veterinary medicine.

This veterinary college, like all of the others, is subject to close scrutiny by the United States Department of Agriculture and the American Veterinary Medical Association. They make annual inspection of our work and facilities for teaching, and we must conform to their standards. There is but one veterinary college in the United States that now stands on the ragged edge of recognition, and it is bending every effort to meet the requirements. No half-baked veterinary colleges, or veterinary diploma factories, are tolerated in this country. The educational standards are now as high as they were in human medicine but a few years back, and the spread between the two is becoming less conspicuous. Veterinary medicine has followed the lead of its sister profession and made a commensurate progress. It has added materially to the economic wealth of the country. It has courageously met its responsibilities in the World War as well as in civil life.

The spirit of commercialism seems to dominate everything these days, and the learned professions have not escaped its blighting influence. It is manifested in the emphasis which is placed upon the diploma and so little appreciation of what it should represent. This places the diploma in the same category with fiat money, which has no collateral behind it. The get-wise-quick idea is in harmony with the spirit of the times. To the unsophisticated youth it looks like a good business proposition to get a diploma in the least possible time, which shall represent an optimum of vantage in securing a job, with a minimum of time and effort. Education for its own sake does not appeal, and the get-wise-quick fallacy is twin sister to the get-rich-quick mania, which appears to be more especially an American characteristic.

The profession of veterinary medicine rests upon a sound educational basis. It has profited by the early mistakes of its sister profession.

We deem it of the utmost importance that we persistently impress upon the minds of our students the fundamental thought that the moral of this profession will stand or fall before the bar of public opinion according to the character and citizenship

of its devotees, individually and collectively; that after all, the standard of public appreciation does not rest entirely upon specialized training, professional efficiency or aptitude; that while the client for the time being rates the man according to the professional services rendered, the banker, the merchant, and citizens generally are rating him according to other standards.

The first thought of educators should be character and citizenship, then to come the specialized training that will enable the recipient to occupy a more satisfying and profitable station in life, where he may render the greatest possible service to his fellow men.

The new veterinary hospital and anatomy laboratory is in every respect appropriate to our needs. Its usefulness has already been reflected in the quality of our work. It is now up to us to prove that we are worthy of such generosity on the part of the State.

"About 99 per cent of the more than 10,000 cattle so far tested for tuberculosis in Oregon are free of the disease, according to preliminary announcement of the results of a survey being made by the agricultural college extension service."—*Pacific Homestead.*

"The elixir of long life consists of soured cow's milk, cheese made from sheep's milk, and white bread, according to Dr. Sandowein, professor of physical chemistry at the University of Kiev. He has discovered a village in the mountains near Temir Khan Shura, the new capital of the Daghestan republic, where 18 men out of a total population of 120 are aged more than 100 years."—*Butter, Cheese and Egg Journal.*

Breeder's Gazette says of the International: "The Government display was probably the best agricultural exhibit ever sent out from Washington, showing methods of swine feeding, management and sanitation that caught the eyes of hog men. The value of a purebred sire was brought out in a forceful way, and also better methods in feeding by two live steers. An elaborate and highly edifying exhibit of materials, specimens, pictorialized facts and graphic literature was made."

THE FIFTH MEDICAL CONGRESS OF CUBA, WITH SPECIAL REFERENCE TO THE VETERINARY SECTION

By A. EICHHORN
Pearl River, New York
Delegate of the American Veterinary Medical Association

IN A SPECIAL SESSION of November 10, 1921, the National Veterinary Association of Cuba decided to request the American Veterinary Medical Association through its President to appoint a delegate to the Fifth National Medical Congress of Cuba which was to meet in Havana from the 11th to the 17th of December. The Veterinary Association requested the organization of the Congress to consider the delegate of the American Veterinary Medical Association as a guest of honor of the Government, with all the prerogatives and honors extended to the other delegates from foreign countries who were invited to attend the sessions of the Congress. Therefore the delegate of the American Veterinary Medical Association was appointed as an official delegate of the Congress and given not only the usual honors but also the usual diplomatic courtesies.

President Kinsley delegated the writer to represent the American Veterinary Medical Association at the Congress, and the writer desires to take this opportunity of extending his appreciation for this privilege, which afforded a most excellent occasion to meet the leaders of the Cuban medical organizations, both professionally and socially.

The veterinary profession was represented by a delegate only from the United States, whereas other branches of medicine had representatives from France, Mexico, the United States and the Central and South American countries. The presence of these official delegates tended to make the Congress somewhat international in character; and in considering the many official functions which were arranged by the Congress it was apparent that the Government of Cuba has given not only official recognition but also financial aid to the Congress.

It would require a very lengthy paper to report the Congress in full, but I can not refrain from mentioning particularly the

splendid social functions given on the occasion to the members of the Congress and the delegates by the President of the Republic in the wonderful new palace; the banquet held at the Tennis Club, one of the most exclusive clubs in Cuba; the dinner of the President of the Congress to the delegates from foreign countries; the luncheon of the French delegates to the other delegates and specially invited guests of the Congress, and the dinner of the foreign delegates to the officers of the Congress. Aside from these functions there were numerous other entertainments. The writer especially desires to express his sincere appreciation to the veterinarians of Cuba, who, individually and collectively, did everything possible to make our stay in Cuba a lasting memory.

No doubt a large share of the credit is due to Dr. Jose A. Presno, President of the Fifth Medical Congress, and Dr. Francisco M. Fernandez, Secretary General, for their untiring efforts. The Congress was most splendidly organized and the professional program was carried out with great precision and in minutest detail.

The Congress was made up of the sections of General Medicine, Surgery, Hygiene, Demography, Legal Medicine, Ophthalmology, Pharmacy, and Veterinary Medicine. Each section held at regular time the various sessions, two sessions being provided for Veterinary Medicine.

The President of the Veterinary Section was Dr. Francisco Etchegoyen, the Director of the Veterinary School of Havana, who deservedly has the highest esteem of the representatives of the veterinary profession, and who, aside from his personal charm, possesses great learning and comprehensive knowledge of the various branches of veterinary science.

Dr. Angel Iduate, who has been for many years the Secretary of the National Veterinary Association, acted also as Secretary of the Veterinary Section. His amiable personality and great tact have endeared him to the veterinarians of Cuba.

PROGRAM OF VETERINARY SECTION

The papers presented before the Veterinary Section were as follows:

A Nondefined Disease of Cattle. Dr. Alberto Recio.

The Country that Does Not Modify Periodically Its Sanitary Legislation and Regulations for the Medical Professions Will Find Its National Wealth Ruined. Dr. Francisco Etchegoyen.

Without Proper Legislation There Can Not Exist a Thriving Cattle Industry. Dr. Bernardo J. Crespo.

Avian Spirochetosis in Cuba. Dr. Angel Iduate.

Ten Years' Experience with Hog-Cholera Serum. Dr. Virgilio Benedicto.

Frequency of Canine Nephritis and the Possibility of Error in Diagnosis of Rabies. Dr. Clodomiro Diaz Silvera.

Immunity in Hogs Inoculated for the Production of Virus. Dr. Anibal Hernandez.

Necessity of Sanitary Police. Dr. Francisco A. M. Valdivieso.

Anthrax in Cuba and Statistics. Drs. Clodoaldo Arias and Angel Iduate.

Diagnosis of Glanders by the Ophthalmic Mallein Reaction. Dr. Juan Sanchez Mouso.

Contribution to the Study of Diagnosis of Glanders by the Intradermal Mallein Test. Dr. Jose Valdes Ruiz.

Deficient Legislation for the Control of Glanders and Tuberculosis. Dr. Jose Tablado Fuentes.

Failures Attributed to Hog-Cholera Serum through Diagnostic Errors and Possibilities of Avoiding Them. Dr. Clodomiro Diaz Silvera.

Ticks: *Boophilus annulatus* and the Australian Tick in Cuba, and Advantages from their Eradication. Dr. Francisco A. M. Valdivieso.

Statistics on Diseases of our Smaller Domestic Animals. Dr. Francisco Etchegoyen.

Papers by Drs. Serafin and Antonio Martinez.

The importance of the Buzzard in the Propagation of Diseases in Cattle. Dr. Luis M. Martinez.

The Value of the Veterinarian in the Improvement of Livestock. Dr. A. Eichhorn.

The papers were of the highest character, and the discussions which followed the reading of the papers were very active, serious and thorough. About forty veterinarians attended the sessions, and the writer was well impressed with the professional training and high character of the representatives of our profession in Cuba. Many of the veterinarians speak or at least understand the English language, and quite a few have graduated from American veterinary colleges. The writer met three graduates of Pennsylvania, two of the New York-American Veterinary College, two of Kansas City and one from the United States Veterinary College.

VETERINARY PROGRESS IN CUBA

The development of the veterinary profession in Cuba is of very recent origin. Prior to the attainment of the Cuban independence there were practically no trained veterinarians in Cuba. Therefore it is a great credit to the country and to the veterinary profession that in the few years they have succeeded in establishing a record which deserves the highest commendation. Up

to a few years ago the Government had no veterinarians in its employ. With the appointment of Dr. Bernardo J. Crespo they took the initial step in organizing a Bureau of Livestock Industry. With his wonderful organizing ability and untiring efforts Dr. Crespo has already a good nucleus for an effectively working Bureau of Animal Industry, and he hopes that in the near future he will succeed in building up an organization in Cuba along the line of the activity of the United States Bureau

Dr. Bernardo J. Crespo, Chief of the Bureau of Animal Industry of Cuba

of Animal Industry. He is striving to obtain laws upon which rules and regulations might be formulated for the control of the infectious diseases, and also to provide a meat-inspection service, which, up to date, is conducted only by the various municipalities. He fully realizes that he has a great task on hand, but with the full support of the veterinary profession and his personal influence and with his constant efforts in that direction he can not help but succeed. Dr. Crespo as Chief of the Bureau of Animal Industry is ably assisted by Drs. C. A. Arias, Angel Iduate, Andros Henriquez and Armando Pascual.

The military veterinary service attained recognition in Cuba for which we have striven in the United States for many years. It represents an independent corps consisting of 26 veterinary officers. Two of these are majors, 9 captains, 9 first lieutenants and 6 second lieutenants. The writer had the opportunity of visiting Camp Columbia, one of the largest military camps in Cuba. On this occasion he observed the splendid and thorough organization of the veterinary service with well-equipped veterinary hospitals, school for farriers and the well-equipped laboratory. Major Luis A. Beltran is commanding the veterinary organization at the camp and is ably assisted by Captains J. M. Sanchez Mouso, Rafael Santamaria, Serafin Santamaria, Antonio M. Martinez and A. Fernandez Malberti. Captain Reinaldo Marquez is in charge of the laboratory, where, aside from routine diagnostic work, they prepare mallein, tetanus antitoxin, typhoid vaccines, etc., both for the use of the animals in the Army and for human use. It is indeed gratifying to know that the veterinary laboratory of the Army service has impressed the military authorities with its abilities, having been given charge of the preparation of the biological products in use for the men of the Army.

Dr. Jesus Vega is stationed at the War Department, ably representing there the military veterinary service. Dr. Vega is also one of the crack polo players of Cuba. He has repeatedly visited the United States with the Army polo team of Cuba, having had the honor of acting as captain of the team.

In the instruction of the cadets the future officers of the Cuban Army Veterinary Service have also been given due recognition. Captain J. M. Sanchez Mouso has charge of the instruc-

tion of the cadets in military hippology and other subjects pertaining to soundness and horsemanship.

The veterinary service in Cuba, being of recent development, has not as yet attained the standing it should occupy. This is no doubt due to the fact that little attention has been paid to the livestock industry of Cuba. While the country is primarily agricultural, all efforts have been concentrated on the development of sugar-cane and tobacco growing. They now, however, realize the disadvantages of concentrating upon one or two products, and there are good indications of efforts to diversify the agricultural interests. The natural resources of Cuba are splendidly adapted for livestock industry and there is no reason why that country should not develop into a producer of high grade livestock.

INFECTIOUS ANIMAL DISEASES

The infectious diseases of livestock in Cuba are very much the same as those occurring in the Southern States of our country, with the exception that tuberculosis is of rare occurrence and that infectious abortion is practically unknown. Most cases of tuberculosis which were found occurred in animals imported from the United States, and the veterinarians of Cuba are at a loss to explain why shipments of cattle from the United States, accompanied by certificates of having passed the tuberculin test, should, on tests there, prove tuberculous. Such occurrences, which are no different from those which have been repeatedly observed to occur in interstate shipmens of certified cattle in this country, will have a tendency to bring into disrepute the value of the tuberculin test certificate and have a harmful effect upon the export trade of our livestock to Cuba, which in time, no doubt, could be developed into an important export trade.

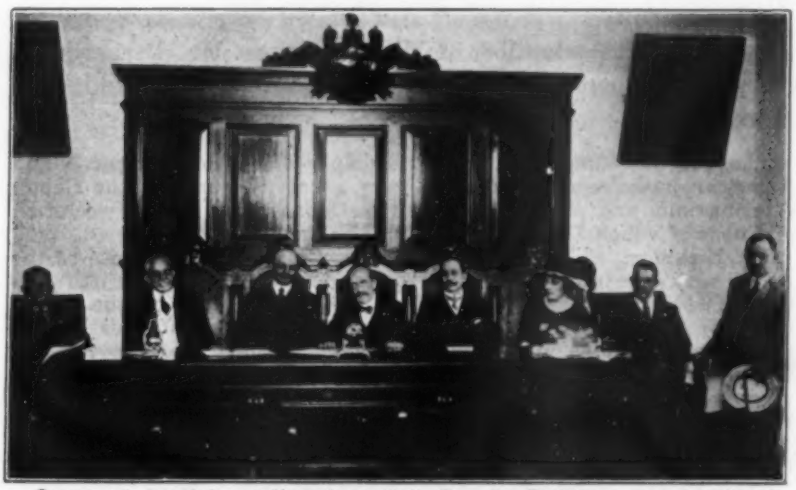
Hog cholera is very widely distributed over the entire island, and the veterinarians in Cuba have very much the same problems on hog diseases as we have in the United States. The consensus of opinion, however, prevails there that the principal disease is the virus cholera, and that the control of this will eliminate the greatest source of danger to hog raising.

A. V. M. A. DELEGATE HONORED

In a special session the writer was honored by being elected an honorary member of the Cuban National Veterinary Associa-

tion, which is especially cherished, as this is the first instance in which a foreigner has been granted this honor. A special meeting of the Veterinary Association was called for December 18, at the council room of the University, where, aside from the members of the association, there were present the Rector of the University, the Dean of the Medical College, the President and

Group of Representatives of the Veterinary and Medical Professions of Cuba on the occasion of electing Dr. A. Eichhorn an honorary member of the National Cuban Veterinary Association. (Dr. and Mrs. Eichhorn seated.)



Group at special meeting in which Dr. A. Eichhorn was elected honorary member of the Cuban National Veterinary Medical Association. From left to right, Dr. Angel Iduate, Secretary of the Cuban National Veterinary Medical Association; Dr. Diego Tamayo, Dean of the Medical Faculty; Dr. A. Eichhorn, delegate of the American Veterinary Medical Association; Dr. Carlos de la Torre, Rector of the National University of Cuba; Dr. Jose A. Presno, President of the Fifth Medical Congress of Cuba; Mrs. A. Eichhorn; Dr. Cosio, delegate from Mexico; Dr. Francisco M. Fernandez, Secretary General of the Congress

the Secretary General of the Congress, the delegates of the foreign countries, and several members of the faculty of the University. At this special meeting the following resolutions were presented by the Executive Committee of the Veterinary Medical Association:

WHEREAS, Our Association in extraordinary general session held on the evening of November 10, decided to invite a member of the American Veterinary Medical Association to act as delegate to the Fifth National Medical Congress;

WHEREAS, That institution appointed Dr. Adolph Eichhorn, illustrious and prominent member of same, who for several years has been regarded as an eminent man in the field of research and veterinary science and enjoys a high reputation in the United States and abroad;

WHEREAS, Our Association appointed said Dr. Eichhorn its honorary guest, and as such and as honorary guest of the Fifth Medical Congress he has attended its sessions and very specially those of the Eighth Section of Veterinary Medicine, taking active and important part in its deliberations;

WHEREAS, Dr. Adolph Eichhorn has all the qualifications required in the Article II of the Rules and Regulations of the National Veterinary Association for the election of honorary member;

The members of the Board of Directors undersigned purpose to the General Board taking the following actions:

1. Elect Dr. Adolph Eichhorn honorary member of the Association.
2. Grant him a diploma as such.
3. That the appointment and delivery of diploma take place during extraordinary general session specially called for.

Following the adoption of the resolutions Dr. Bernardo J. Crespo, President of the Association, delivered the following address:

The presence among us of Dr. Adolph Eichhorn, eminent North American pathologist, has been a very great pleasure for the Cuban veterinarians and an honor for the National Veterinary Association of Cuba, of which I have the honor to be President.

Dr. Eichhorn, as we all know, came to Cuba as the delegate of the American Veterinary Medical Association to attend the Fifth National Medical Congress, which terminated yesterday, on the acceptance by that association, to our great satisfaction and pleasure, of the invitation which we extended some weeks ago.

The purposes that inspired the motion adopted in the extraordinary general session celebrated by this body on the 10th of November ultimo, to request that the American Veterinary Medical Association honor us by sending a delegate to the Fifth Medical Congress to be celebrated in this city, were crowned with the greatest success on the designation of Dr. Eichhorn.

It having been our aspiration to initiate the establishment of a state of close relationship between the elements that constitute the great American Veterinary Association and that of Cuba, for the mutual benefit that may be derived, especially on our part, on account of the reduced number of associates and the short time we have been organized, it gives me great pleasure to be able to say that this aspiration has been fully satisfied by the cordial friendship

that has been formed between the two associations by the presence of Dr. Eichhorn, a friendship that the Cuban veterinarians will try to perpetuate for the greater success of our profession in Cuba.

As a legitimate manifestation of our friendship and appreciation of the personal merits of Dr. Eichhorn and the official character he represents among us as delegate of the American Veterinary Medical Association, as well as for his valuable collaboration in the work of the Veterinary Section of the Fifth Medical Congress, this institution conferred on him the distinction of guest of honor, and the Association takes pride in repeating these sentiments by means of this presidency in the solemn act we are now celebrating especially for the purpose of electing Dr. Eichhorn an honorary member of the National Veterinary Association of Cuba.

Permit me, Dr. Eichhorn, to request that on your return to the United States you will kindly extend to Dr. Kinsley, the President of the American Veterinary Medical Association, in my name and in that of the Cuban veterinarians, our sincere and affectionate salutation, telling him that in this little island, very close to the great North American republic, there exists an association that will endeavor in every manner to maintain an exchange of ideas and aspirations with the association which he represents, in order to make more effective the cordiality that we hope to maintain between the two associations, to our great satisfaction and benefit.

The National Veterinary Association of Cuba will feel very well satisfied if during the short time that Dr. Eichhorn and his distinguished wife have been among us they have been agreeably impressed, and on return to their country will have pleasant memories of their visit to Cuba, and at the same time, in my own name and in that of the Association, I wish to express the most sincere wishes for a pleasant return voyage to the United States.

Likewise Dr. Carlos de la Terre, Rector of the University, and Dr. Diego Tamayo, Dean of the Medical Faculty, also made very fitting remarks on the occasion.

The writer expressed profusely his profound thanks for the honor conferred upon him, especially emphasizing the fact that he considered this splendid recognition not particularly for his own self, but more as an honor to the Association that he represented. He also expressed the hope that the occasion would initiate closer relations between the members of the veterinary profession of the United States and those of Cuba.

The ceremonies were concluded with a buffet luncheon, as, in fact, was the case with many of the delightful affairs arranged for the guests and delegates from foreign countries.

In conclusion I can not refrain from expressing my deepest gratitude to all the Cuban confrères who made our sojourn in Cuba one of the most delightful incidents of our lives. From the time of our arrival at Havana until our departure they proved untiring in their profuse hospitality. On our departure from

our short but busy stay in Cuba we feel that we left behind many dear friends whom we hope to meet again.

I hope that the American Veteinary Medical Association will foster the pleasant relationship initiated by the Cuban National Veterinary Association and establish a closer intercourse between the veterinary profession of Cuba and that of the United States.

TALES OF BUGS

By FRANCES MCMINDS

THE halls of state are now resounding with thrilling tales of bugs abounding; of germs above, below, surrounding, that must be vanquished "quick." Once more with its bovine afflatus, inspiring statesmen to berate us, comes "margaropus annulatus," known commonly as the "tick."

"The present law is too elastic; no good can come of one so plastic"; they say, "it should be made more drastic if we would make it stick. Our quarantine must be more rigid; so strict that none will dare to bridge it; we'll make all malefactors fidget who would protect that tick. 'Tis true, we have lime sulphuration, a strong commercialized hydration, sulphide arsenic preparation, in which the bug to flick; but just suppose the disinfection should meet the insect's deep objection, and he should thus escape detection, as might some slippery tick. We'll supplement our Texas barriers against all annulatus carriers; we'll be their omnipresent harriers, from plutocrat to 'hick.' We'll take each insect by the gullet; we'll find its stinger and we'll pull it; we'll mould a medicated bullet, but what we'll get that tick."

And so they talk of antiseptic, while statesmen grow more apoplectic, with collars moist and faces hectic, as if they'd shy a brick at any who in moderation would counsel less appropriation than in their own wise estimation would serve to squelch the tick. But still the species annulatus, unconscious of this dire hiatus, is sharpening its apparatus for subcutaneous prick; for pyrotechnics but amuse it, though rhetoricians may abuse it; it grins the while the State pursues it—that legislative "tick."—*From Houston Post Special.*

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

SWINE ERYSIPELAS [1]

By J. C. QUINLAN
San Francisco, California

RECENTLY I had an outbreak of a peculiar disease on a hog ranch containing about 1,000 hogs close to San Francisco. These hogs had all been vaccinated against hog cholera by me. The disease at first was a puzzle to me, so I called in several veterinarians in consultation, some having the reputation of experts on hog diseases. The latter called it cholera, others called it swine-plague. I, however, was not satisfied with either of the diagnoses, and after considerable study, reading, and several post-mortem examinations, I came to the conclusion that I had swine erysipelas or red fever of swine (Law's Veterinary Medicine, Vol. IV).

The disease in many respects resembles cholera or swine plague. However, you have not the dark bloody diarrhea, with the terrible odor from it, as in cholera, but you have a yellow diarrhea with no odor. You get red to purplish blotches on the belly and sternum, at the roots of the ears and at the point of the snout. Many of the hogs pass blood through the nose, have hunched backs, staggering gait, and always want to crawl under the litter. Some have temperatures as high as 109° F., while others, 24 hours before death, show subnormal temperatures of 96° F. Fat pigs lose control of the hind legs entirely, drinking plenty of water but with little or no appetite. Many of them show no red blotches on the belly or sternum, but on the side of the neck.

Post-mortem shows the blood very dark and thick; liver enlarged and very dark; spleen enlarged and very dark, almost pimply on the surface; lungs in most cases are engorged with dark blood, showing double pneumonia in advanced stages. A small portion of the lung in a few cases would still have its normal color. All of the glands are very dark brown, although a few of them are light red in the center of the gland, but dark on the outside. Inside of the stomach are patches of dark red, and the same are noted in the intestines. Very few of the kidneys

[1] Other articles on swine erysipelas will be found on pages 133 and 139 of the May, 1921, issue of the JOURNAL.

show any petechial spots, and then only several such points.

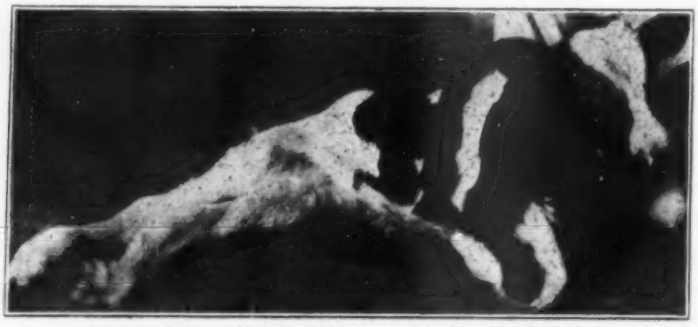
What made me investigate this outbreak was the absence of those lesions which I usually get in cholera, such as bright red blood, with petechiated bladder, kidneys, intestines, ileo-cecal valve, lungs and epiglottis, also the dark bloody diarrhea, with its specific odor which you never forget.

I took samples of the urine and a spleen to two different laboratories, one of the Letterman General Hospital at Presidio, and they both found the bacillus of rouget plentiful in the urine. At the Letterman Hospital they injected white mice with the bacillus, which proved fatal in less than 24 hours, and they then found the bacillus plentiful in the heart's blood of the mouse.

CONGENITAL ANKYLOSIS IN A CALF

By THOMAS B. CARTER
Portland, Oregon

I WAS CALLED to see a cow that was straining as if in labor trying to give birth to a calf. On examination I found a breech presentation with the hind legs extending forward along the calf's abdomen. When an effort was made to flex the hind legs, it was found that they were stiff and would not flex in any of the joints. By repelling the rump forward with my arm and



Congenital ankylosis in hind legs of calf

giving traction on the legs with a chain around the fetlocks, I was able to turn the feet back and deliver the calf. This is easier said than done, as it took the better part of an hour.

The calf was quite normal from the sacrum forward, but from the sacro-lumbar articulation back there was no movement in any joint except those of the fetlocks and digits. The hocks, stifle and hip joints were ankylosed solid.

ABSTRACTS

Clinical Studies of the Action and Use of Suprarenin in the Horse. Dr. Habersang. Monatshefte f. prakt. Tierheilkunde, vol. 32 (1921), p. 127.

The maximal therapeutic dose of suprarenin hydrochloricum (adrenalin) for the horse is subcutaneously 0.00002 to 0.00004 gram per kilo (9 to 18 c.c. of the 1:1000 sol. for 1000 lb. horse); intravenously, 0.00001 gram per kilo. The primary effect is arterial constriction and blood pressure rise; secondarily and especially with excessive doses, the reverse takes place. Rise in blood pressure puts a load on the heart which is directly stimulated to perform more work, but no additional strength is given the heart. Adrenalin is indicated for local anemia also after internal hemorrhage and collapse following excessive hemorrhage. It is contraindicated in (a) all heart abnormalities or diseases, (b) all lung conditions that might be adversely affected by increased blood circulation, (c) in all diseases accompanied by high blood pressure, (d) in infectious diseases that have weakened the heart and circulatory system. The danger of secondary collapse must be guarded against. Suprarenin is the best diaphoretic for the horse when intravenously injected. Local necrosis is to be guarded against in subcutaneous injection.

W. N. Berg.

Properties and Effects of Oestrin and its Relation to Pernicious Anemia of Horses. R. Seyderhelm. Archiv fur Exper. Pathologie u. Pharmakol., vol. 82 (1918), pp. 253-326.

Toxic substances were obtained by extracting gastrophilus larvae with various solvents and fractionating the solutions by chemical methods. The effects of the various fractions were tested on horses and laboratory animals. Among the substances obtained, two are of special importance; (1) a lipoid substance which hemolyzes red cells in vitro but which is not related to the anemia, and (2) oestrin, a poisonous substance which is not hemolytic in vitro, but causes typical anemia when injected into rabbits and horses in sub-lethal doses. The claims made by

French investigators (Carré and Vallée) that the anemia is infectious and due to a filtrable virus, is disputed. Oestrin is a poison resembling snake venom in its action.

W. N. BERG.

GENERAL ANESTHESIA IN THE HORSE BY INTRAVENOUS INJECTION OF CHLORAL HYDRATE. M. Moussaron. Rev. Vétérinaire, vol. 73 (1921), no. 9, p. 538.

A solution of 50 grams of chloral hydrate in a liter of boiled water was injected into the jugular vein. The apparatus used consisted of a fine bleeding trocar, attached to one end of a rubber tube 60 to 80 cm. long, with a glass funnel fitted to the other end of the tube. The solution was warmed to 37° C. before introducing into the vein. About a minute or two after the injection and sometimes even before completing the injection, the animal is taken with sudden symptoms simulating drunkenness; it staggers and soon falls to the ground. There is profound insensibility and surgical operations or cautery can be undertaken without further means of restraint.

This method gives quick results, requires the aid of no assistants, and is safe. The dose used by the author is 50 grams chloral hydrate in 1 liter of water for a horse weighing from 450 to 500 kg. (990-1,100 lbs.). The duration of anesthesia is about one and a half hours.

L. T. GILTNER.

TRANSMISSION OF PARATUBERCULOSIS (JOHNE'S DISEASE) TO EXPERIMENTAL ANIMALS. C. W. Andersen. Arch. Wiss. u. Prakt. Tierheilk., vol. 47 (1921), no. 1, p. 77.

The artificial transmission of Johne's disease to calves, sheep and goats is easily accomplished, but aside from a single instance reported by Twort, small laboratory animals (rabbits) have not been infected. Andersen reports that in a series of experiments in which 22 rabbits were used, some of which were injected subcutaneously, others intravenously, and still others fed emulsions of intestines and mesenteric lymph glands of cattle affected with Johne's disease, and also pure cultures, he was able to reproduce the disease in six cases. The autopsy findings were almost identical to those found in cattle, viz.,

small intestines much thickened and verrucose; mesenteric glands swollen. Both the intestine and glands contained many bacilli. None of the other organs showed pathologic changes or harbored organisms. The affected rabbits remained in good flesh and showed no diarrheal symptoms at any time. Pure cultures were obtained from the mesenteric glands of the rabbits.

In a supplementary note the author states that he has succeeded in cultivating Johne's bacilli on ordinary glycerine bouillon. The surface of the medium was covered with a thick, wrinkled membrane. Paratuberculin prepared from such cultures was tested (0.5 gm. subcutaneously) on a herd of 25 cattle in which there had been some losses from Johne's disease. Three reactors were obtained. Forty-eight other cows were injected intracutaneously; on one side with paratuberculin and on the other with avian tuberculin. Of these 28 reacted to the paratuberculin, and only 16 to the avian tuberculin.

L. T. GILTNER.

CONTRIBUTION TO THE KNOWLEDGE CONCERNING THE DIAGNOSIS OF BIPOLAR INFECTION IN ANIMALS. W. Pfeiler and A. Kohlstock. Zeitschr. f. Infekth. etc. der Haustiere, vol. 21 (1921), no. 4, p. 276.

The results of the author's experiment show that the intraperitoneal inoculation of laboratory animals is decidedly superior to the subcutaneous method for demonstrating bipolar infections. The rabbit is more susceptible to the infection than the guinea-pig. Mice are not as safe animals to use for diagnosing the disease as the other experimental animals. Mice are highly susceptible to decomposition bacteria and streptococci, which kill them within a short time. In some cases mice die a long time after being inoculated without showing the specific bacteria in their tissues, while guinea-pigs and rabbits inoculated at the same time die of the infection.

If the tissues sent to the laboratory are fresh and contain numerous bacteria which are also highly virulent, the subcutaneous injection of the inner part of the ear of the rabbit is successful, but in other kinds of specimens this method is not so certain. Rabbits are resistant to decomposition bacteria, and such organisms develop less readily in the peritoneal fluid than

in the subcutaneous tissues. Finally the resorption from the peritoneal cavity of any bipolar bacilli that may be present is so quick that any tendency on the part of the decomposition organisms to outgrow the bipolar bacilli is not to be feared. Guinea-pigs are relatively more susceptible to decomposition and other septic organisms than the rabbit.

L. T. GILTNER.

THE MEAT OF HEALTHY ANIMALS IS FREE FROM BACTERIA. E. Bruge and W. Kiessig. Allatorvosilapok., 1921, page 95.

The authors conclude from their investigation that the muscle of healthy animals is contaminated by various bacteria, not as a consequence of distribution of bacteria from the alimentary canal during lifetime, as Condrady describes, but from other causes. Special consideration should be given to the incisions made on the animals at the time of slaughter. Through these openings the butchers remove blood clots, etc., with their unsterile hands or fingers. The contamination is furthered by the cutting of the esophagus. In the jugular vein and in the anterior vena cava negative blood pressure exists. Contaminated material around these open blood vessels, from the butchers' hands or from the severed esophagus, will be drawn into the right auricle of the heart, from there into the right ventricle; thence into the lungs; from there back to the left side of the heart. Then the blood will be forced into the aorta, and into the tissues of the entire animals. Blood samples taken from healthy animals at the time of slaughter were found to be sterile. But blood and muscle samples taken from the same animals at various intervals after slaughter showed various degrees of contamination with various kinds of bacteria. According to the authors, the contamination of the meat of healthy animals occurs at the time of slaughter. This conception is supported also by the finding of various kinds of bacteria in the slaughtered animals' organs. In judging contaminated meat, aside from post-mortem contamination (such as insanitary handling of meat), the contamination of the meat at the time of slaughter should receive more consideration.

M. BORSOS.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-eighth Annual Meeting, Denver, Colo., September 5 to 9, 1921

(Continued from the February JOURNAL)

REPORT OF THE EDITOR OF THE JOURNAL TO THE EXECUTIVE BOARD

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION for the year from October, 1920, to September, 1921, volumes 11 and 12, new series, has contained an average of 130 pages of reading matter, an increase of 10 pages over the average for the preceding period. Its contents have included the proceedings of the fifty-seventh annual meeting of the Association, 125 original papers, 37 clinical and case reports, 66 abstracts of research papers (practically all foreign), 8 book reviews, 92 reports and notices of meetings of veterinary associations and other gatherings, 42 editorials, and numerous miscellaneous articles and items.

A gratifying increase is apparent in the number of clinical and case reports and in other material of a practical nature. Members of the profession are responding better than formerly to our requests for papers of this character. The co-operation of our Resident State Secretaries and of secretaries of State and local associations in sending in reports and papers is appreciated and a continuation is solicited. Along with research papers of good quality and papers dealing with education and public service it is our desire to publish a good proportion of practical articles suited to the needs of the most numerous class of our membership, the practitioners. With the co-operation of all concerned, and especially of the practitioners themselves in reporting interesting and helpful cases, we can make the JOURNAL of still greater value to the profession.

I remember that the *New York Medical Journal* used to publish brief prize essays on subjects previously announced. These seemed to me to be exceedingly practical and valuable to medical

practitioners. The plan, as I recall it, was to announce a subject, some disease or ailment of general interest, and invite brief articles (not exceeding, say, 500 words), to be submitted by a certain date, with cash prizes to the best three. The prize-winning articles were then published. The object was to set forth effective *methods of treatment*, not to describe diseases.

It seems to me that this plan, which is submitted for your consideration, might be very good for the JOURNAL, to arouse interest among practitioners, help them in dealing with difficult cases and to improve their methods, and bring in a supply of material of a class different from the longer papers. Subjects should be announced at least three months ahead, and the Sub-Committee on Journal should award the prizes of, say, $15, $10 and $5.

A notable increase has also been made in the abstracts of foreign literature. By this means our readers have been given the results of the important research work done abroad and have thus been enabled to keep abreast of developments in the field of veterinary science throughout the world. Our acknowledgments and thanks are tendered to our collaborators who have assisted in translating and abstracting this material. In this connection I desire to call attention to the increasing number of our original articles which have been published in their entirety or abstracted by many foreign periodicals.

The advancement and development of the veterinary profession and the further elevation of standards of education have been kept constantly in mind. Among the admirable papers aimed in this direction was a notable one entitled "Our Profession," by President White.

Notwithstanding an increase in our advertising rates, the patronage of our advertisers has been well maintained in the face of adverse business conditions. Our advertisers evidently appreciate the advantages of our official organ as a medium for placing their announcements before a large and select body of veterinarians.

Likewise our subscribers have increased in number, notwithstanding that the price for the JOURNAL was raised 33 1/3 per cent, or from $3 to $4 per annum.

Though comparisons are said to be odious, the following may be of interest in reference to the relative income from the above sources: In 1919 the advertisers paid $4,832.53 and the sub-

scribers $1,297.46; total, $6,129.99. In 1920 the advertisers paid $5,641.91 and the subscribers $1,806.50; total $7,448.41. The above-mentioned years are comparable because the rates for advertisements and subscriptions were the same. In 1921, with the increase effective, we have collected in eight months $4,183.42 for advertisements and $1,643.56 for subscriptions, which on a yearly basis would be $6,275.13 for advertisements and $2,465.34 for subscriptions, or a total of $8,740.47.

Dr. Jacob informs me that he has received this year from Secretary Mayo and myself for the JOURNAL account $21,372.15, as against $12,477.30 last year. In addition, mention should be made of the fact that four of our debtors went into the hands of receivers, but our losses were less than $100 in all. Furthermore, we hold $900 of bills receivable in the form of notes which become due during October and November.

During the year further improvement was made in the typographical appearance of the JOURNAL and in the quality of paper used. We have also been able to obtain better service in the prompt printing and mailing of the monthly editions, as well as a 10 per cent reduction in the cost of publication. The detailed information concerning this latter subject has been furnished to Dr. J. A. Kiernan, of the Sub-Committee on Journal, at his request.

All my records, bank book, check book, letter files, duplicate deposit slips, monthly statements from the bank, quarterly statements to the Executive Board, etc., were turned over to a qualified accountant for review, and his certificate of examination and audit is attached for your information.

Respectfully submitted. J. R. MOHLER, *Editor*.

REPORT OF THE TREASURER

FROM AUGUST 4, 1920, TO AUGUST 4, 1921, INCLUSIVE

RECEIPTS

1920		
Aug. 25.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	$982.24
Sept. 11.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	6,638.95
Oct. 16.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	4,302.83
" 19.	Interest on bonds, Journal Fund	229.41
" 19.	Interest on bonds, A. V. M. A.	229.41

1920			
Nov.	19.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	$1,048.38
Dec.	11.	Interest on bonds, Journal Fund	20.00
"	11.	Interest on bonds, A. V. M. A.	20.00
"	11.	From Dr. J. R. Mohler, Journal Fund	2,027.10
"	20.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	388.11
1921			
Jan.	22.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	2,395.43
Feb.	18.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	1,602.13
"	21.	Interest on U. S. bonds, Journal Fund	93.50
"	21.	Interest on U. S. bonds, A. V. M. A.	96.25
"	21.	Interest on certificate of deposit, Relief Fund	80.00
Mch.	18.	From Dr. J. R. Mohler, Journal Fund	2,771.92
"	18.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	473.54
Apr.	22.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	1,040.20
May	20.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	855.50
June	16.	From Dr. N. S. Mayo, A. V. M. A. and Journal Fund	355.05
"	17.	From Dr. J. R. Mohler, Journal Fund	2,251.42
July	19.	From Dr. N. S. Mayo, A. V. M. A., Journal and Relief Funds	718.88
"	30.	From Dr. J. R. Mohler, Journal Fund	1,616.55
Aug.	4.	Interest on bonds, Journal Fund	239.96
"	4.	Interest on bonds, A. V. M. A.	239.97
			$30,719.73

EXPENDITURES

ASSOCIATION FUND

Aug.	9.	Dr. H. D. Bergman, expenses Committee on Intelligence and Education	$178.25
"	9.	S. B. Newman & Co., letter files	1.30
"	9.	Commercial Stationery & Loose Leaf Co., supplies	25.39
"	9.	Dr. N. S. Mayo, salary for July, 1920	100.00
"	9.	Dr. N. S. Mayo, office expenses for July, 1920	73.20
"	9.	The Ravenswood Press, printing	62.35
"	9.	The Evanston Letter Service, multigraphing	19.92
"	9.	The Ravenswood Press, printing	6.25
Sep.	11.	Dr. W. G. Chrisman, expenses resident secretary for Virginia	5.00
"	11.	G. H. Smith, services preparing report	16.75
"	11.	Kenfield-Leach Co., printing Columbus meeting program	162.00
"	11.	Dr. W. A. Hilliard, expenses resident secretary for Manitoba	6.85
"	11.	Dr. R. P. Marsteller, expenses resident secretary for Texas	5.00
"	11.	Dr. H. D. Bergman, hotel expenses at Columbus account meeting Committee on Intelligence and Education	12.00

1920			
Sep.	11.	Dr. M. H. Reynolds, expenses Com. on Tuberculosis	$ 5.95
"	11.	Dr. L. E. Day, expenses Com. on Int. and Education	43.56
"	11.	Dr. C. A. Cary, expenses of President's office	22.62
"	11.	Horse Association of America, for ten shares of stock	50.00
"	11.	Dr. N. S. Mayo, expenses of Secretary's office for August	246.05
"	11.	The Ravenswood Press, envelopes	17.25
"	11.	Dr. N. S. Mayo, salary for August	100.00
"	11.	Dr. R. V. Kennon, refund acct. application not accepted	10.00
"	11.	Dr. J. G. Slade, refund acct. application not accepted	8.75
"	11.	Dr. J. R. Scully, refund acct. application not accepted	10.00
"	11.	Dr. W. H. Lynch, refund acct. application not accepted	10.00
"	11.	Dr. I. A. Anderson, refund acct. application not accepted	8.00
"	11.	Dr. R. P. Marsteller, expenses resident secretary for Texas	5.00
"	11.	Dr. J. H. Bias, refund acct. application not accepted	10.00
"	11.	Dr. C. W. Cranford, refund acct. application not accepted	10.00
"	11.	Dr. W. G. Saunders, refund acct. application not accepted	10.00
"	11.	Dr. N. R. Yarborough, refund acct. application not accepted	10.00
"	11.	Dr. J. F. Brown, refund acct. application not accepted	10.00
"	11.	Dr. J. F. Kagey, refund acct. application not accepted	10.00
"	11.	Dr. W. B. Casilear, refund acct. application not accepted	10.00
"	11.	Dr. W. H. Hoskins, expenses to Omaha account Salmon Memorial Fund, and office expenses for June and July	89.27
"	11.	Dr. G. W. Gillis, expenses resident sec. for Ind.	10.02
"	11.	Dr. W. H. Welch, expenses resident sec. for Ill.	52.21
"	11.	N. S. Mayo, expenses self and assistant attending meeting at Columbus	150.30
"	11.	Dr. Tait Butler, expenses Com. on Int. and Education	95.30
"	11.	Dr. F. A. Lambert, expenses resident sec. for Ohio	16.35
"	11.	Dr. Hadleigh Marsh, expenses resident sec. for Montana	6.70
"	11.	Dr. C. P. Fitch, printing for Com. on Abortion	11.50
"	11.	Dr. F. M. Cahill, expenses resident sec. for Mo.	22.15
"	13.	Prof. H. Vallée, contribution to Belgian Relief Fund	500.00
"	25.	Dr. C. A. Cary, expenses attending Columbus meeting	107.13
"	25.	S. B. Newman & Co., printing annual report	47.50
"	25.	Dr. Frank Edwards, refund of 1920 dues	5.00

1920			
Sep.	25.	Dr. M. Jacob, expenses attending Columbus meeting	$ 40.96
"	25.	H. P. Hoskins, expenses account Section on Sanitary Science and Police	10.20
"	25.	Capt. H. S. Williams, refund on duplicate application	10.00
"	25.	Wm. F. Lipps, premium on bond of Secretary A. V. M. A.	12.50
"	25.	Dr. A. T. Peters, refund of 1920 dues	5.00
Oct.	15.	The Ravenswood Press, envelopes and postal cards	60.75
"	15.	The Ravenswood Press, letter heads	26 50
"	15.	Dr. N. S. Mayo, office expenses	114.85
"	15.	Dr. Cassius Way, expenses Com. on Ind. and Education	101.52
"	15.	Master Reporting Co., reporting Columbus meeting	372.73
"	15.	Dr. W. Horace Hoskins, expenses Com. on Legislation	23.01
"	20.	Dr. N. S. Mayo, salary for September	166.66
Nov.	1.	E. J. Powers, letter heads and envelopes	17.75
"	1.	Champlin Printing Co., printing for Pres. White	12.00
"	1.	Workman Mfg. Co., printing ledger sheets	17.50
"	1.	Master Reporting Co., extra copies report Columbus meeting	109.80
"	1.	Dr. H. D. Bergman, stationery for Committee on Intelligence and Education	14.75
"	1.	The Ravenswood Press, printing membership cards	36.25
"	13.	Dr. N. S. Mayo, salary for October	166.66
"	13.	Dr. N. S. Mayo, office expenses	74.10
"	13.	Dr. C. S. Rockwell, expenses resident sec. for Pa.	4.56
"	20.	The Ravenswood Press, printing cards	14.50
Dec.	4.	Shepard, Toms & Co., premium on bond of Treas.	35.00
"	4.	Dr. D. S. White, expenses attending assn. meeting in Tennessee	56.86
"	4.	Honaker, Florist, floral wreath for Dr. Musselman	15.35
"	4.	Dr. N. S. Mayo, expenses of office for November	48.23
"	4.	Dr. N. S. Mayo, salary for November	166.66
"	11.	Dr. D. S. White, expenses attending meetings	58.69
"	11.	Bowman Pub. Co., printing constitution and by-laws	560.00
"	16.	City National Bank, Knoxville, certificate of deposit	3,000.00
"	24.	Dr. Ward Giltner, expenses Com. on Abortion	23.62
"	24.	Dr. C. P. Fitch, expenses Com. on Abortion	60.00
"	24.	Dr. J. F. DeVine, expenses Com. on Abortion	123.15
"	24.	Dr. H. D. Bergman, expenses Committee on Int. and Education	49.00
1921			
Jan.	10.	Dr. N. S. Mayo, salary for December	166.66
"	10.	Dr. N. S. Mayo, office expenses	231.43
"	10.	Dr. J. N. Frost, expenses shipping A. V. M. A. library	10.00
"	10.	The Ravenswood Press, printing	231.50
"	29.	Dr. Cassius Way, expenses Committee on Int. and Education	125.74
"	29.	G. H. Smith, stenographic services to Dr. Jacob	1.00

1921

Feb.	5.	Horse Association of America, annual dues	$ 50.00
"	5.	Dr. D. S. White, expenses attending meeting in Wisconsin	51.47
"	5.	The Ravenswood Press, printing	53.00
"	5.	Dr. N. S. Mayo, salary for January	166.66
"	5.	Dr. N. S. Mayo, office expenses for January	123.31
"	14.	Dr. D. S. White, expenses attending meetings	99.23
"	19.	Dr. L. W. Goss, expenses Com. on Int. and Education	49.78
"	19.	Dr. D. S. White, expenses attending meeting in Michigan	31.96
Mch.	10.	Evanston Letter Service, multigraphing	10.22
"	10.	Dr. D. S. White, office expenses	13.89
"	10.	Dr. N. S. Mayo, office expenses for February	79.54
"	10.	Dr. N. S. Mayo, salary for February	166.66
"	26.	The Ravenswood Press, printing	92.61
Apr.	2.	Dr. N. S. Mayo, salary for March	166.66
"	2.	Dr. N. S. Mayo, office expenses for March	62.00
"	2.	The Ravenswood Press, envelopes	17.06
"	2.	Journal of the A. V. M. A., back numbers of Journal	35.00
"	2.	The Ravenswood Form Letter Shop, form letters	6.90
"	2.	Dr. L. Enos Day, expenses Com. on Int. and Education	76.88
"	15.	Dr. L. W. Goss, expenses Com. on Int. and Education	128.59
"	25.	Dr. H. D. Bergman, expenses investigating southern veterinary colleges	189.15
"	25.	Shepard-McManus Co., premium on bond of Treas.	25.46
"	25.	The Dartnell Corporation, printing vouchers	7.75
"	25.	Dr. W. Horace Hoskins, floral wreath for Dr. Cochran	11.53
May	6.	The Campus Press, printing	8.25
"	6.	Dr. N. S. Mayo, office expenses for April	60.65
"	6.	Dr. N. S. Mayo, salary for April	166.66
"	20.	Champlin Printing Co., printing	9.00
June	3.	Marshall Jackson Co., blank book	4.25
"	3.	Federal Printing Co., envelopes	8.50
"	3.	Dr. N. S. Mayo, office expenses for May	70.05
"	3.	Dr. N. S. Mayo, salary for May	166.66
"	3.	Dr. S. E. Bennett, expenses account Executive Board business	40.70
"	28.	Dr. L. W. Goss, expenses Com. on Int. and Education	36.30
"	28.	Dr. Thos. E. Smith, expenses collecting Liautard American Veterinary Relief Fund	17.30
"	28.	Dr. M. Barker, expenses as resident sec. for Saskatchewan	3.00
"	28.	Artcraft Mfg. Co., buttons for Denver meeting	18.13
"	28.	Dr. D. S. White, office expenses for three months	17.11
"	28.	Dr. H. D. Bergman, expenses Com. on Int. and Education	89.25
July	12.	Dr. N. S. Mayo, salary for June	166.66
"	12.	Dr. N. S. Mayo, office expenses for June	35.92
"	25.	Dr. H. D. Bergman, expenses as resident sec. for Iowa	14.50

1921			
July	25.	Dr. Cassius Way, expenses Com. on Int. and Education	$ 66.87
"	30.	Dr. E. T. Harrington, expenses resident sec. for Massachusetts	10.00
"	30.	Dr. D. S. White, expenses atttending meetings	119.10
Aug.	3.	Dr. N. S. Mayo, office expenses for July	50.45
"	3.	Dr. N. S. Mayo, salary for July	166.66
			$11,781.59

EXPENDITURES

JOURNAL FUND

1920			
Aug.	20.	Andrew B. Graham Co., printing July edition of Journal	$1,142.79
Sep.	11.	Andrew B. Graham Co., printing August edition of Journal	1,270.48
"	11.	Dr. J. R. Mohler, salary for June and July	350.00
"	11.	Marcus W. Kling, assisting in business management of Journal	45.00
"	11.	Gibson Bros., Inc., envelopes and printing	24.50
"	11.	James M. Pickens, assisting in editing Journal	45.00
"	25.	Gibson Bros., Inc., envelopes and printing	107.50
Oct.	15.	Andrew B. Graham Co., printing September edition of Journal	1,344.46
"	15.	Marcus W. Kling, assisting in business management of Journal	45.00
"	15.	Dr. J. R. Mohler, salary for August	175.00
"	15.	James M. Pickens, assisting in editing Journal	45.00
Nov.	1.	James M. Pickens, assisting in editing Journal	45.00
"	1.	Andrew B. Graham, printing Oct. edition of Journal	1,232.56
"	1.	Marcus W. Kling, assisting in business management of Journal	45.00
"	13.	Marcus W. Kling, assisting in business management of editing Journal	45.00
"	13.	Dr. J. R. Mohler, salary for Sept. and Oct.	500.00
"	20.	Andrew B. Graham Co., printing November edition of Journal	1,214.11
"	20.	Gibson Bros., Inc., envelopes and printing	21.00
Dec.	4.	James M. Pickens, assisting in editing Journal	45.00
"	11.	Gibson Bros., Inc., envelopes and printing	49.00
"	11.	Addressograph Co., purchase price of addressograph	222.75
"	24.	Andrew B. Graham Co., printing December edition of Journal	1,179.03
1921			
Jan.	10.	James M. Pickens, assisting in editing Journal	45.00
"	10.	Marcus W. Kling, assisting in business management of Journal	45.00
"	10.	Gibson Bros., Inc., envelopes and printing	231.00
"	10.	Dr. J. R. Mohler, salary for Nov. and Dec.	500.00
"	10.	Marcus W. Kling, assisting in business management of Journal	45.00
"	29.	James M. Pickens, assisting in editing Journal	45.00
"	29.	Andrew B. Graham Co., printing January edition of Journal	1,323.03

1921

Feb. 19.	Marcus W. Kling, assisting in business management of Journal	$ 45.00
" 19.	Andrew B. Graham Co., printing February edition of Journal	1,209.07
" 19.	James M. Pickens, assisting in editing Journal	45 00
Mch. 21.	Dr. J. R. Mohler, salary for Jan. and Feb.	500.00
" 21.	Marcus W. Kling, assisting in business management of Journal	45.00
" 28.	Andrew B. Graham Co., printing March edition of Journal	1,241.17
" 28.	James M. Pickens, assisting in editing Journal	45.00
Apr. 15.	Hayworth Publishing House, printing April edition of Journal	1,102.35
" 15.	Hayworth Publishing House, envelopes for forwarding Journal	145.00
" 25.	James M. Pickens, assisting in editing Journal	45.00
" 25.	Marcus W. Kling, assisting in business management of Journal	45.00
May 20.	Marcus W. Kling, assisting in business management of Journal	45.00
" 20.	Hayworth Publishing House, printing May edition of Journal	1,095.55
" 20.	Dr. J. R. Mohler, salary for March and April	500.00
June 3.	James M. Pickens, assisting in editing Journal	90.00
" 28.	Marcus W. Kling, assisting in business management of Journal	45.00
" 28.	Hayworth Publishing House, printing cards	15.50
" 28.	Hayworth Publishing House, printing June edition of Journal	1,115.07
July 12.	Dr. J. R. Mohler, salary for May and June	500.00
" 25.	Hayworth Publishing House, printing July edition of Journal	1,068.61
" 25.	Marcus W. Kling, assisting in business management of Journal	45.00
" 25.	James M. Pickens, assisting in editing Journal	45.00
		$20,459.78

EXPENDITURES

RELIEF FUND

Apr. 15.	Mrs. S. F. Musselman, contribution authorized by the President, Secretary and Executive Board	$500.00

Knoxville, Tenn., August 4, 1921.

Dr. M. Jacob, Treasurer,
American Veterinary Medical Association,
Knoxville, Tennessee.

Dear Sir:

We enclose herewith cancelled checks and statements of the balances as of this date in the following accounts:

American Veterinary Medical Association	$ 405.99
Journal Fund	2,605.99
Relief Fund	712.16

Yours truly,

THE CITY NATIONAL BANK,
R. E. MOONEY, *Vice-Pres.*

RECAPITULATION

Bank balances at beginning of period	$5,560.29
Plus amount on time deposit (Relief Fund)	2,000.00
	$7,560.29
Less checks cashed during period which were issued and included in previous report	182.07
	$7,378.22
Receipts during period covered by this report	30,719.73
	$38,097.95
Less expenditures during period	32,741.37
	$5,356.58
Plus amount placed on time deposit of A. V. M. A. funds and included in expenditures above	3,000.00
Total cash on hand	$8,356.58
Total bonds on hand	18,984.78
Grand total	$27,341.36

ASSOCIATION FUND

Bank balance at beginning		$ 3,173.19
Less old checks cashed		182.07
		$ 2,991.12
Receipts during period		8,828.90
Total		$11,820.02
Expenditures during period		11,781.59
Balance		$ 38.43
Bank balance	$405.99	
Less outstanding checks	367.56	
	$ 38.43	
Plus amount on time deposit		$ 3,000.00
		$ 3,038.43

JOURNAL FUND

Bank balance at beginning		$ 1,693.62
Receipts during period		21,372.15
Total		$23,065.77
Expenditures during period		20,459.78
Balance		$ 2,605.99
Bank balance	$2,605.99	

RELIEF FUND

Bank balance at beginning		$ 693.48
Receipts during period		518.68
Total		$ 1,212.16
Expenditures during period		500.00
Balance		$ 712.16

Bank balance	$712.16	
Plus amount on time deposit	$ 2,000.00	
Total on hand	$ 2,712.16	
Balance to credit of A. V. M. A. Fund	$ 38.43	
Plus amount on time deposit	3,000.00	
Plus amount of bonds on hand	9,515.00	
		$12,553.43
Balance to credit of Journal Fund	$ 2,605.99	
Plus amount of bonds on hand	9,469.78	
		12,075.77
Balance to credit of Relief Fund	$ 712.16	
Plus amount on time deposit	2,000.00	
		2,712.16
Total balance cash and bonds on hand		$27,341.36

BOND RECAPITULATION

Canada bonds, par $3,000.00, purchase price	$3,023.20	
Liberty bonds, par 7,000.00, purchase price	6,491.80	Assn. Fund
$10,000.00	$9,515.00	
Canada bonds, par $7,000.00, purchase price	$6,619.78	
Liberty bonds, par 3,000.00, purchase price	2,850.00	Journal Fund
$10,000.00	$9,469.78	

M. JACOB, *Treasurer.*

COLORADO VETERINARY MEDICAL ASSOCIATION

The nineteenth annual meeting of the Colorado Veterinary Medical Association was held at Denver on January 19, 1922.

The chief items of business were reception of the report of the Committee on the American Veterinary Medical Association; the decision to withhold further publication of proceedings for another year; the adoption of the idea of an animal anesthetic law in principle, as presented by the Blue Cross Society; the decision to hold a three-day summer session, and the decision to hold a two-day winter session in future.

The following were elected to membership: Charles L. Davis, Max C. Grandy, L. P. Leavitt, Harry S. Richards, Frank R. Smythe.

The election of officers resulted in the selection of the following: President, J. F. Meinzer; first vice-president, C. C. Stewart; second vice-president, W. G. Blake; secretary-treasurer, I.

E. Newsom. Executive Committee: M. J. Warner, William B. McGuire, A. G. Wadleigh.

Dr. G. W. Stiles presented a paper on farm sanitation, in which he called attention to considerable laxity in this respect. Dr. Stiles spoke particularly of the water and food supply, illustrating his paper from cases of his own experience and laboratory examinations made in connection with his work as pathologist for the Bureau of Animal Industry.

Dr. A. N. Carroll presented a paper in which he outlined a plan for the coordination and unification of all veterinary societies. He stated that a committee from the American Veterinary Medical Association was working on the same idea. Following the reading of the paper, the association adopted the plan in principle and appointed a committee for furthering the idea.

Dr. W. E. Howe reported on the tuberculosis conference at Chicago, and Dr. C. G. Lamb on the meeting of the United States Livestock Sanitary Association.

Dr. George H. Glover read a paper on posterior paralysis in swine, in which he brought out that the present knowledge indicated that the disease was due to a food deficiency, possibly being some vitamin. It was reported that Dr. B. F. Davis of Cheyenne, Wyoming, had excellent results in feeding carrots to affected animals.

Dr. R. F. Bourne read a paper on vitamins in which he went into considerable detail in outlining this new addition to our knowledge. I. E. NEWSOM, *Secretary.*

MAINE VETERINARY MEDICAL ASSOCIATION

The annual meeting of Maine Veterinary Medical Association was held in Augusta, Me., on January 11. Election of officers resulted as follows: President, Dr. C. F. Davis; Vice President, Dr. E. E. Russell; Secretary and Treasurer, Dr. P. R. Baird. There was a good attendance and many interesting and profitable discussions took place. Hon. H. M. Tucker, Chief of State Department of Agriculture, gave an interesting talk on the activities of his department during the past year. Dr. A. L. Murch presented a paper on "Sterility." Dr. M. E. Maddocks read a paper on "Drugs from a Financial Angle." A commit-

tee was appointed to confer with the Blue Cross Society in drafting some form of anesthetic law for animal operations.

Resolutions were passed upon the death of Dr. W. L. West, of Belfast, whose sudden and untimely end was a shock to his brother practitioners, as he seemed in the best of health.

Next meeting will be held in Portland, April 12, with a clinic in the afternoon and meeting in the evening.

P. R. BAIRD, *Secretary.*

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Connecticut Veterinary Medical Association was held at the Hotel Guard in Hartford February 1, 1922. At this meeting a cummunication was read from Dr. John R. Mohler, Chief of the Bureau of Animal Industry, informing the association that the holding of a Tuberculosis Conference under the direction of the Bureau of Animal Industry, in cooperation with the Veterinary Medical Association and the Live Stock Sanitary Officials of this State, met with his approval. It was also voted that this conference should not only include the New England States, but that invitation should also be extended to New York, New Jersey and Pennsylvania, inviting them to participate in the proceedings of this meeting, which will be held at Hartford, Conn., during the first week in June.

GEO. E. CORWIN, *Secretary.*

VETERINARY COURSE IN CALIFORNIA IS WELL ATTENDED

One of the biggest events of the Short Course Week at the University Farm, Davis, Calif., was the Veterinary Practitioners' Conference. The veterinarians came from all sections of the State, and some from the East. The program for the week was arranged by the California State Veterinary Medical Association in cooperation with the Division of Veterinary Science of the University of California. Dr. J. F. McKenna was Chairman for the week.

There were special lectures given by D. H. Udall, head of the Department of Medicine, Obstetrics and Ambulatory Clinic,

College of Veterinary Medicine, Cornell, New York; K. F. Meyer, Professor of Research Medicine, University of California; and B. H. Rawl of the Central Creameries, formerly Assistant Chief of the United States Bureau of Animal Industry.

These lectures were based entirely on diseases of cattle, tuberculosis and the value of accredited herds. Demonstrations were held almost daily at the clinic.

Officials from the outside cooperating were:

University of Nevada: Edward Records, Stephen Lockett and Lyman Vawter. State: G. H. Hecke and J. P. Iverson. Federal: Lieut.-Col. Van Agnews and Robert Jay.

J. Traum in his lecture on accredited herds was strong in trying to bring to California the value of accredited herds. There seems to be a feeling, he said, that unless the California dairymen adopt the movement now on foot all over the United States the bottom will drop out of the California dairy market.

WISCONSIN VETERINARY MEDICAL ASSOCIATION

The association held its annual meeting in the Senate Chamber and was called to order by Dr. A. J. Abbott, of Marshfield, President. The address of welcome was made by C. P. Norgord, Commissioner of Agriculture, who officiated for the Governor. This was responded to by Dr. L. A. Wright, of Columbus.

The first afternoon was devoted to routine business and the election of officers. Dr. H. E. Horel, of Augusta, was elected president; G. H. Harland, of Pewaukee, vice-president; W. H. Richards, of Morrisonville, treasurer; R. S. Heer, of Platteville, succeeds himself as director, and O. H. Eliason was elected secretary.

After the business was disposed of the association listened to a paper on "Mastitis," by Dr. W. F. Nolechek, of Throp, Wisconsin, and "Control of Roup and Chicken Pox," by Dr. A. B. Beach, of the College of Agriculture.

The evening session was spent in listening to addresses on "The Study of Feeding of Farm Animals," and "The Type and Breeds of Farm Poultry." Profs. J. M. Fargo and J. G. Halpin, of the College of Agriculture, gave excellent papers on these subjects.

Thursday morning's discussion was on the subject of "Hog

Cholera and Other Related Swine Diseases," and Dr. T. P. White of Washington, in the office of Hog Cholera Control, was present and added his observations on that subject.

The afternoon discussion was on the subject of tuberculosis, with special reference to the accredited herds, and the general program was supported by Dr. Enos Day, of Chicago, special investigator for the Bureau of Animal Industry who added materially to the day's program.

At 6:30 p. m. one hundred and fifty attended the banquet in the State Capitol Café, presided over by Dr. C. A. Deadman, and a profitable evening was enjoyed by all. The program was opened by the Honorable John J. Blaine, Governor of Wisconsin, who told of his appreciation of the work of the veterinarians in Wisconsin in the eradication of animal diseases and expressed the hope that Wisconsin might soon eradicate tuberculosis among cattle within the borders of Wisconsin. Other speakers were Wayne Dinsmore, of Chicago, Secretary of the Horse Breeders' Association of America; Dr. H. D. Pattison, of Beloit, who gave a toast to the ladies and brought down the house with his humorous stories which he is so capable at telling; Dr. O. H. Eliason, who told of his experiences as State Veterinarian for the past ten years, and Commissioners C. P. Norgord, who told of the State Department of Agriculture.

Friday was devoted to an extensive clinic at Dr. J. P. West's hospital on Washington avenue. This was very well attended and a profitable day was spent.

O. H. ELIASON, *Secretary.*

DATE OF MEETING OF SOUTHEASTERN STATES ASSOCIATION CHANGED

The executive committee of the association decided it would be of best interest for the members and all veterinarians to change the date of the next meeting, which is to be held in Nashville, Tenn., and definitely fixed the convention date for March 13 and 14, 1922.

The change was necessary on account of conflicting dates with other meetings in which many veterinarians are interested, and a larger attendance has been assured on the date of March 13 and 14.

Among the speakers appearing on the program who will address the association will be found the names of Dr. A. T. Kinsley, President of A. V. M. A.; Dr. B. H. Ransom, Chief Zoological Division, B. A. I.; Dr. L. A. Klein, University of Pennsylvania, and other prominent veterinarians.

One session of the convention will be given exclusively to papers and discussions of parasitic diseases of swine and young cattle, and another session to papers by State Veterinarians of each of the Southeastern States. A clinic will be held on the afternoon of the last day, March 14, at the hospital of Dr. Wm. Bell, Nashville, Tenn.

All the veterinarians of the adjoining states are especially invited to attend this meeting. Programs will be mailed from the Secretary's office on February 20. Any veterinarian not receiving a copy will be furnished one by notifying the Secretary.

JNO. I. HANDLEY, *Secretary.*

NEW MEMBER OF EXECUTIVE BOARD

The result of the ballot for a member of the Executive Board of the A. V. M. A. from the Sixth District is as follows: B. W. Conrad, Sebetha, Kansas, 124; D. F. Fox, 99; H. Jensen, 99; J. H. Bux, 15; N. F. Williams, 15; unsigned ballots, 5; scattering, 2.

N. S. Mayo, *Secretary.*

Gov. W. P. G. Harding, of the Federal Reserve Board, in an analysis of the business situation, told members of the United States Potters' Association, in session at Wahington, that conditions throughout the nation are much better than they were a year ago and that America is on the verge of a great revival. He said: "The readjustment is not completed in some lines, as the farmer is not yet back to normal conditions. Until he gets his normal purchasing power we will not really have normal times; but the farmer's condition has materially improved, being benefited by the War Finance Corporation."

A monument to the late Professor Arloing has been erected at Cusset, France. Professor Leclainche was designated to represent the Academy of Sciences at the ceremonies.

NECROLOGY

It is with much regret that the JOURNAL chronicles the death on February 4, of Dr. R. A. Archibald, practitioner and President and Manager of the Western Laboratories, Oakland, California. Dr. Archibald had been in poor health for a period of three years following an attack of influenza in December, 1918. Congestion of the brain was the immediate cause of death.

Dr. Archibald was born in Queens County, Ireland, in 1870. He came to the United States in 1887, shortly thereafter entered the Chicago Veterinary College, and graduated from that institution in 1891. He had been active in veterinary circles ever since that date, having been fourth vice-president of the A. V. M. A. in 1914 and president in 1916. He was a member of the Executive Board for the last five years.

R. A. ARCHIBALD
President of the American Veterinary Medical Association 1915-1916

Dr. Archibald had specialized in bacteriology, and in 1899 became Assistant Bacteriologist of the City of Oakland. He was appointed to the Professorship of Bacteriology in the Oakland College of Medicine and Surgery in 1908, and to a similar office in the San Francisco Veterinary College in 1909. He was in charge of food inspection and city veterinarian in Oakland for 16 years. He was three times elected President of the California State Veterinary Medical Association, and was for fifteen years a member of the California State Board of Veterinary Examiners, which stamps him as the veterinary leader of the Pacific Coast.

Dr. Archibald contributed considerably to veterinary literature. Among his writings may be mentioned "Apparent In-

consistencies of Biologic Diagnostics," "Preliminary Report on the Value of Leukocytic Extract from a Therapeutic Standpoint," and "The Laboratory and Its Relation to Medical Science."

Shortly after his graduation, Dr. Archibald went from Chicago to California to establish a veterinary practice, and as he was wont to say, "did not travel in a Pullman." Through the acquisition of valuable land, he built up considerable revenues for himself and in connection with his veterinary practice and the production of biological products, had amassed a very snug fortune. His death, which is mourned by his widow and a legion of loyal friends, removes another strong exponent of the veterinary profession in the United States.

TUMORS IN ETHMOID BONES OF HORSES

In a recent congress of pathologists at Stockholm, Sweden, Henschen of Stockholm demonstrated specimens of tumors grown in the ethmoid bones of horses. During the last few years this disease had assumed an epizootic character in Sweden and was included with diseases which the veterinarian must report. Clinically, the disease started as an acute suppurative rhinitis, which became chronic and assumed a hemorrhagic nature. Later, several tumors became visible. The histologic examination of each growth shows a number of tumors of different character; side by side occur carcinoma, adenocarcinoma and papilloma. The multiple appearance of the tumor, its polymorphism, the clinical history and the presence of lymphoid cell infiltrations make one believe that the etiology may be an organized virus. No attempts to demonstrate this, nor any transplantation experiments have, however, succeeded.

Hoard's Dairyman says: "Moscow Township (Mich.) has the distinction of being the first township in the U. S. in which all breeding cattle have been tested for tuberculosis. The entire campaign (covering the whole county of Hillside) was very successful in the opinion of all concerned, and the Bureau of Animal Industry has demonstrated what can be done to aid in the eradication of this disease with which 11 per cent of the swine and nearly 3 per cent of the cattle of the United States are affected."

MISCELLANEOUS

MEMORIAL MEETING TO DEAN HOSKINS

A memorial meeting was held at the New York State Veterinary College, New York University, on Monday evening, December 12, 1921, in honor of the late Dean W. Horace Hoskins. A portrait of Dean Hoskins was draped with the American and College flags. Dr. W. G. Hollingworth, president of the Alumni Association, presided. The services were opened by prayer by the Rev. Guthrie Spiers.

The first speaker was Elmer Ellsworth Brown, Chancellor of New York University. Chancellor Brown's address was particularly impressive in its sincerity. There could be no mistake as to his feeling toward Dean Hoskins, a man of whom he had become very fond. He had met but few men who had the ability of Dean Hoskins to carry his high ideals of his profession so ably to others, peculiarly associating his work always with the love of his country. Dean Hoskins' enthusiasm, logic and ability at once attracted the attention and sympathy of every department of the University to the Veterinary Department.

The next speaker was the Rev. Guthrie Spiers, who spoke in the absence of Dr. Hoskins' very close friend, the Rev. George Alexander, pastor of the University Presbyterian Church. Dr. Spiers had found Dean Hoskins' life an unusual blending of a Christian spirit with his work. He mourned the fact that a man with such wonderful energy and numberless interests could not have been spared, but it was plain to even a casual observer that his boundless energy was fast burning up his life.

Dr. John P. Munn, member of the Council of the New York University, spoke next. It was, indeed, good to listen to the inspiration breathed by this good old friend of the veterinary profession. He told so beautifully what Dean Hoskins had done for the "old school," and what his profession had done for the country, adding that Dean Hoskins is not dead, but has simply gone; his spirit will never die. This being so, he pleaded for the support of all to continue the glorious task that the Dean had undertaken.

Dr. V. A. Moore, Dean of the Veterinary Department of Cornell University, then recited some of the strong, brave qualities

of Dean Hoskins. He had always admired the Dean for his courage and his loyalty to any cause he represented.

Dr. Moore was followed by Dr. John Adams, representing the Veterinary Department of the University of Pennsylvania. Dr. Adams had known Dean Hoskins more or less intimately for thirty years. He was always impressed with the quiet dignity of the man, his wonderful interest in all things, his sympathetic nature fitting so beautifully with his work, his clean mind, being too much absorbed in big things to be interested in unclean things, and his outstanding natural ability as a leader, always planning, organizing and improving the upbuilding of his profession.

Dr. L. D. Ives next spoke as a representative of the United States Department of Agriculture. Dr. Ives expressed gratitude for the many things that Dean Hoskins had done to help the men in the Bureau of Animal Industry, this emphasizing his many activities and the influence he had on so many phases of his profession.

The Veterinary Corps of the United States Army was represented by Col. Gerald E. Griffin. It is as a member of the Army Legislative Committee, he said, that Dean Hoskins' tenacity and almost superability stand in such bold relief. Col. Griffin told interestingly of Dean Hoskins' eighteen years of persistent laboring in behalf of the Army veterinarians. It is only by knowing the trials and vicissitudes of this work and the barriers to be overcome that one can realize what this man did for the Army veterinarians. All this proved so plainly to those who were in touch with it that Dean Hoskins never had a personal ambition. His sole thought was the betterment of every branch of his chosen profession.

Dr. J. F. DeVine next spoke as a representative of the American Veterinary Medical Association, mentioning that Dean Hoskins had been a member of this Association for thirty-six years without ever missing a meeting, that he had served five years as its Secretary and three years as its President, and that his continued interest in the service of the American Veterinary Medical Association was without parallel in our profession.

The next speaker was Prof. William Herbert Lowe, representing the Veterinary Department of the New York University. He mentioned that he had already expressed his great admira-

tion for Dean Hoskins in an article he had recently furnished the journals. He wished to emphasize that one of the prominent things of Dean Hoskins' life that will keep his memory alive was service.

Dr. W. Reid Blair represented the New York State Veterinary Medical Society. Dr. Blair's remarks were a splendid testimony to the loyal qualities of Dean Hoskins.

Dr. Robert McKeller, representing the Veterinary Medical Association of New York City, spoke of some of the great assistance that had come from Dean Hoskins to this Association, and that the spirit of his work was sure to leave its influence upon the Association.

Dr. R. E. Mosedale expressed for the New Jersey State Association the sadness occasioned by the loss of Dean Hoskins.

The student body of the Veterinary College then presented the following resolution:

RESOLUTION ADOPTED AT MEETING OF THE VETERINARY STUDENTS' ASSOCIATION OF NEW YORK UNIVERSITY, OCTOBER 2, 1921

WHEREAS, It has pleased Almighty God to remove from our midst on August 10, 1921, our late Dean, Dr. W. Horace Hoskins, into a kingdom greater than that on this earth. The unseen hand of an all-wise Providence has taken one of our staunchest advocates for a united and brotherly interest among practitioners and students. In his capacity as Dean, we found him to be a guiding light, true and sincere friend and fatherly counselor, and largely through his efforts the noble work of the veterinary profession has been brought before the entire country.

Therefore Be It Resolved, That the Veterinary Students' Association, in meeting assembled, takes this means of expressing their heartfelt sympathy and offer sincere condolence to the bereaved wife of our benefactor.

Be It Further Resolved, That a copy of these resolutions be read at the memorial meeting and then presented to his beloved wife, Mrs. W. Horace Hoskins.

Be it Further Resolved, That a copy of these resolutions be incorporated in the minutes of the Students' Association of the New York State Veterinary College at New York University.

T. C. RALSTON, President; JOHN W. WATT, Vice-President; L. ROTH, Secretary; A. W. MEYER, Treasurer.

NEW HOOKWORM TREATMENT MAY BE USEFUL IN HUMAN MEDICINE

The toll exacted from the livestock industry by internal parasites such as worms is enormous, and because of this drain on the herds and flocks the scientists of the Bureau of Animal Industry keep up an unflagging search for chemicals and treat-

ment that may be used to combat these organisms. Recently they have discovered that a certain chemical once used in medicine as an anesthetic and now used variously as a fire extinguisher, cloth cleaner, insecticide, and solvent for fats and gums, is very effective as a destroyer and expeller of intestinal worms. The name of this chemical is carbon tetrachloride.

The effectiveness of this chemical against certain round worms has been announced by the Department, but what may be the most beneficial use has just been brought out by tests on animals infested with hookworms. In the case of sheep the minimum effective dose has not yet been determined, but all the doses used, from 12 cubic centimeters to 48, in each case given in 2 ounces of castor oil, removed all stomach worms and all hookworms. It has been equally effective for hookworms in dogs and foxes, and has been used with success against some of the various kinds of worms that infest the digestive tract of pigs.

The fact that a species of hookworm also affects man makes this discovery of the efficacy of this chemical against hookworms in various animals of interest to medical men as well as to veterinarians. Medical men are now trying it out at several places as a possible cure for hookworm disease in man, and it gives promise of success. As a result of the work so far completed, it is believed that this drug will prove of special value in the removal of the various kinds of blood-sucking worms in domestic animals.

FEWER VIOLATIONS OF FOOD AND DRUG LAW

The manufacturer who violates the Federal Food and Drug law today is an artist compared with the violator of a few years ago. He does not offend so frequently or so flagrantly, but he is harder to catch. The gross and crude violations so frequently found during the early days of the law's enforcement by the U. S. Bureau of Chemistry have given place to more subtle forms that, to be detected, require more careful investigation. On the whole, violations are much less frequent. Only a small portion of the food and drugs in interstate or foreign commerce is either adulterated or misbranded.

In the enforcement of this law during the last year 1,677 shipments were seized and 608 criminal prosecutions ordered.

The seizures and prosecutions recommended were based most frequently upon shipments of patent medicines, including stock remedies and stock feeds.

The activities of the year on patent medicines included 866 actions directed mainly toward the elimination of false and fraudulent claims on the labels regarding curative powers for a great variety of diseases. The stock feed cases, 152 in number, were based on products deficient in protein or otherwise failing to conform to the claims made upon the labels.

So-called lithia waters containing only the merest traces of lithium, but alleged to be of the greatest therapeutic value because of their lithium content, have been virtually eliminated from the market. Interstate commerce in mineral waters and other drugs alleged to contain radium which were put on the market following the announcement that radium effected wonderful cures, threatened to develop to large proportions, but was stopped before it attained much momentum.

Effective campaigns have been carried on to eliminate from interstate commerce shipments of milk and cream highly contaminated with bacteria. Some contaminated mineral springs have been closed, while in others the manner of handling the product and of purifying it have been revolutionized. Methods have been devised for the detection, by means of the microscope, of decomposed fruits and vegetables in prepared food products. Investigations have been made to establish as fully as possible the character of the practices necessary to protect consumers from food poisoning, and the information has been disseminated widely.

USE FOR A HORSE

Our township trustee sent a physician to render service to an indigent family. The physician noticed an emaciated horse in a ramshackle shed and asked: "What use have you for a horse?" "We use him to go out into the country and haul in hay for him," replied the head of the household.—*H. D. F. in Journal of the American Medical Association.*

Dr. Henry M. Graefe, inspector in charge of the United States Bureau of Animal Industry, stationed at Topeka, Kansas,

had a narrow escape from asphyxiation on January 9, when he was overcome by the fumes of a gas stove in his home.

Dr. Graefe's life was probably saved by his wife, who dragged him out of the bath room after she had heard him fall.

Dr. D. F. Luckey, for many years State Veterinarian of Missouri, has resigned his position in order to accept the appointment of Livestock Commissioner with the St. Louis Live Stock Exchange, where he will concentrate his efforts on the control of animal tuberculosis. The JOURNAL wishes to congratulate the Exchange in securing the services of such a competent, energetic and painstaking official.

Dr. F. E. Barnes, resident secretary of the A. V. M. A. for the State of Texas, has just been reappointed a member of the State Veterinary Medical Examining Board of that State. Dr. T. W. Watson, of Corsicana, has also been appointed a member of the Examining Board.

Dr. J. O. Young, of 626 Clay Street, Topeka, Kansas, has just moved into his new home, and his new veterinary hospital is nearly completed. The hospital is built of stone of modest construction, and will be arranged to care for both large and small animals.

Dr. C. C. Winegardner, of Goshen, Indiana, has been in Indianapolis, Indiana, taking the two weeks' post-graduate course at the Indiana Veterinary College. He reports having received much useful information from the excellent lectures and clinics given in the course.

Dr. C. W. Bowers, of 1117 Kansas Avenue, Topeka, Kansas, is completing a new home and has also started work on a new veterinary hospital. The doctor has faith in the future of his profession.

Dr. G. W. Browning, who has been in practice at La Grange, Ga., has moved to Mobile, Ala., with enlarged facilities and equipment for his professional work.

In the Control of Bovine Infectious Abortion

WHY NOT TAKE A

Short Cut to Immunity

BY USING

Jen-Sal

Living Culture Bovine Abortion Vaccine

On non-pregnant cows 60 days before breeding and on all virgin heifers which are to be retained in the breeding herd, and thus save the owner a large per cent of losses that may occur before natural immunity is established.
Per vial, 1 treatment, single injection, 20 mil.....$1.00
Per vial, 10 treatments, single injection, 200 mil..... 9.00

USE

Jen-Sal Killed Culture Bovine Abortion Bacterin

On pregnant cows during the first 60 or 90 days after pregnancy or 30 days before breeding.
Per vial, 1 treatment, single injection, 20 mil.....$1.00
Per vial, 10 treatments, single injection, 200 mil..... 9.00

Send for Complete Literature

THE JENSEN-SALSBERY LABORATORIES

520 West Pennway, Kansas City, Missouri

For Small-Animal Practice

The newest and most practical innovation is the

Strasco Jr.

With Automatic Tray

It has won instant favor with small-animal practitioners and general practitioners who like to keep their medicine and supplies for small-animal practice conveniently ready for immediate use.

Built like our popular STRASCO, it is durable, good looking, and arranged correctly. Size 16 inches long, 7 inches high, and 6¼ inches wide.

Price, $15.00 filled; $7.00 empty, with three trays.

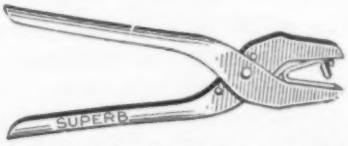
Let us send literature and further information about this popular new case. It's just the thing for small-animal practice.

R. J. STRASENBURGH COMPANY

ROCHESTER Manufacturing Chemists since 1886 NEW YORK

"SUPERB" EAR TAG

"THE HUMANE TAG"



Cuts a Round Plug Out of the Ear, Inserts the Tag and Rivets It in One Operation

Can Be Used But Once

For Cattle, Sheep and Hogs

SUPERB CATTLE TAG

Each Tag has space for Name, Address and Number

Manufactured and Sold by

THE SACHS-LAWLOR CO., INC.

1543 Larimer St., Denver, Colorado

Ether Vaporizing Outfit for the Treatment of Mastitis in Cattle, as used and devised by A. T. Peters, D. V. M., Peoria, Illinois

The treatment consists in etherizing the udder, which technique is almost the same as that used in treatment of milk fever, only that the ether is not injected into the quarters (but that it is allowed to be vaporized into the quarters). This is accomplished by inserting a milk tube into the quarter affected, to which a rubber tubing has been attached and to the other end of this tubing a metal cylinder. The ether is poured into the metal cylinder, then immersed in boiling water, which will cause an almost instant vaporization. This way allows the ether vapor to penetrate through the entire quarter affected. To prevent the escape of the ether vapor tie tape around the entrance of quarter.

Dr. Peters has had very satisfactory results from this method due to the fact that ether has a powerful germicidal effect and that the vapors of ether penetrate into every crevice of the udder, thereby destroying the growth and multiplication of the germs.

For complete details covering this treatment refer to *The Vitamineral News,* Volume 1, Number 2, dated August, 1921.

Outfit consists of a heavy brass, nickel-plated cylinder, two ounce capacity, to which is attached six feet of tubing of proper size and attached thereto a self-retaining milk tube.

Price of Outfit Complete - - - - $2.00

SHARP & SMITH

Manufacturers and Exporters of High-Grade Veterinary Surgical Instruments and Hospital Supplies

65 E. LAKE STREET, CHICAGO, ILLINOIS

Established 1844 **Incorporated 1904**

GUARANTEED TO GIVE SATISFACTION

M·A·C

Accepted and used by the Veterinary Profession since 1900

For Splints, Spavins, Curbs, Side Bones, Shoe Boils, Ossifications, Inflamed Tendons, Bursal, Lameness, Etc.

ADVANTAGES

Can be applied in a few seconds.
Does not soil the hands.
Does not blemish the horse.
Horse may be used every day.
Lower in price than imitations.
Guarantee label may be detached leaving only your name.

WE TAKE THE RISK

If "M-A-C" Fails on Fairly Selected Cases We Will Replace Your Loss.

PRICES

Single Bottle	$ 2.00
¼ doz. and one free	5.00
½ " " two "	8.00
1 " " four "	15.00
2 " " eight "	25.00

MANUFACTURED AND FULLY PROTECTED BY **CARTER-LUFF CHEMICAL CO.,** HUDSON, N. Y.

"VETERINARY PHARMACEUTICALS"

WRITE FOR OUR CATALOGUE

Treatments Close to Nature Are Better

In impactions of horses and cattle instead of trying to whip the tortured bowel into futile efforts to move a load that it is incapable of, by the use of rapid-acting cathartics, why not reduce the mass to liquidity, tone up the bowel, and gently stimulate it to empty itself, by using

BOVOLAX

This superior saline cathartic is a compound of Nux Vomica, Quassia, Capsicum, Dried Sodium Sulphate, and Dried Magnesium Sulphate. As the dried salts are 50 per cent stronger than ordinary salts, and as Bovolax is supplied in full 20-ounce cartons, one carton of it is equal to two 16-ounce cartons of ordinary Saline Purgative.

Bovolax holds water in the bowel and pulls more in from the blood and tissues. Every movement of the animal, and every contraction of the bowel, slushes water up against the impaction; and after awhile it softens and slips away down the bowel.

The irritated bowel is soothed by the saline fluid; tendencies toward inflammation are decreased; stress on the heart relieved; and nature, aided instead of outraged, quickly establishes normal conditions without shock to the organism.

12 full twenty-ounce cartons $2.75

FRANK S. BETZ COMPANY

HAMMOND, INDIANA

Chicago, 30 E. Randolph Street **New York, 6-8 W. 48th Street**

THIRTY YEARS OF SATISFACTORY SERVICE

to the allied medical professions
necessarily means quality

That gratifying sense of confidence in results is yours when you dispense or prescribe products bearing the Abbott label

Suggestions for Canine Practice

List No.

847 Canine-Distemper Bacterin (Mixed)
in boxes of six 2 mil ampules and 20 mil bulk containers

988 Anti-Distemper-Serum (Canine)
in 20 mil and 100 mil bulk containers

866 Calcidin (Iodine at its best)
1 gr. coated tablets in bottles of 100, 500 and 1000

1080 Triple Arsenates with Nuclein, No. 3
coated tablets in bottles of 100, 500 and 1000

THE ABBOTT LABORATORIES

Dept. 30, 4739-53 Ravenswood Ave., Chicago

An interesting brochure "Canine Clinical Suggestions" will be mailed to veterinarians forwarding this coupon.

Dr. .....

Address .....

City ..... State .....

MINERAL-VITOL

(AMVETSCO)

Decreases abortion and sterility, overcomes malnutrition, prevents rickets, "breaking down in the back," enlarged joints, lameness and related conditions. Increases milk flow.

Scientifically Correct

Mineral-Vitol contains the essential mineral elements that are intimately involved in maintaining the proper equilibrium of the body fluids, combined with vitamines in such form for easy assimilation.

Profitable Results

Will follow the use of Mineral-Vitol. The many reports received following its use have been eminently satisfactory. The veterinarian will not only increase his profits by recommending Mineral-Vitol but his clients as well.

Prescribe Amvetsco Mineral-Vitol

Per 5-lb. carton	$0.90
Per 20 5-lb. cartons	16.00
Per 50-lb. drum	6.75
Per 100-lb. drum	12.50

WRITE FOR FURTHER PARTICULARS

AMERICAN VETERINARY SUPPLY CO.
Kansas City, Mo.

Indianapolis, Ind. **St. Paul, Minn.** **St. Louis, Mo.**

PASTEUR LABORATORIES OF AMERICA

BIOLOGICAL PRODUCTS

THERE HAS NEVER BEEN ANY QUESTION ABOUT THEIR ABSOLUTE SUPERIORITY. WHY NOT USE THE BEST?

Pasteur's original and genuine *Anthrax Vaccine* is now furnished in single and double treatment. It positively prevents anthrax.

Profs. Leclainche & Vallée's Liquid Blackleg Vaccine is a true and perfectly attentuated vaccine, and has revolutionized live stock vaccination. Why risk your professional reputation with makeshift blackleg vaccine?

Full information regarding the above, as well as Tuberculin, Mallein, Intra-Dermo Palpebral Malleination, Antitetanic and Antistreptococcic Serum, etc., furnished on request.

Pasteur Laboratories of America

New York, 366-368 W. 11th St.

Laboratoire des Vaccins Pasteur pour l'Etranger and Institute Pasteur, Paris, France, Biological Products.

Diseases of the Genital Organs of Domestic Animals

By W. L. WILLIAMS

Professor Emeritus, formerly Professor of Obstetrics and Research Professor of the Diseases of Breeding Cattle, in the New York State Veterinary College at Cornell University.

Eight hundred and seventy-four pages, eight colored engravings, and two hundred and forty illustrations in text. The only comprehensive treatise on the subject in any language. 1921. Price, $10.00.

By the Same Author

Veterinary Obstetrics

Six hundred and fifty pages, three colored plates, and one hundred and forty illustrations in text. Universally recognized as the foremost authority. 1917. Price $5.00.

Surgical and Obstetrical Operations

Two hundred and six pages with seventy-four illustrations. Fourth Edition. 1919. Price, $3.00

The books in the above list are not sold at discount to dealers. All orders should be addressed, with remittance, to W. L. WILLIAMS, Ithaca, N. Y.

FRED GROSS, D. V. M., Pres. Sales Manager.
C. D. NEWHART, D. V. M., Vice-Pres. Superintendent of Production.
M. J. FARBER, M. D., Sec'y. and Treas.

REX

Veterinarians!

SERUM AND VACCINE CO.

Assures You on Its Merit in Service, Purity and Potency

Laboratories and Office West of Lake and Alabama Aves.

Address: P. O. Box 86, Station D., St. Joseph, Mo.

ALL THAT THE NAME SIGNIFIES

PRODUCERS and DISTRIBUTORS ANTI-HOG-CHOLERA SERUM and HOG CHOLERA VIRUS

U. S. Veterinary License No. 154

POLICY—We Solicit the Patronage of the Veterinary Profession Only

We handle a full line of Veterinary Biologics

PHONE, WRITE, WIRE US YOUR ORDERS

If you have not made your contracts for 1921 or future, write us today.

REX SERUM and VACCINE CO.

P. O. Box 86, Station D. **St. Joseph, Mo.**

ANNOUNCING
the Organization of the
PEERLESS SERUM CO.

of Kansas City, Kansas

U. S. Vet. License No. 168

We wish to announce to the veterinary profession the organization of the Peerless Serum Company. Walter J. Lopp, D. V. S., formerly President of the Universal Serum Co., of East St. Louis, Ill., together with Mr. C. L. Charles, formerly President of the United Serum Co., have organized the above named company.

Dr. Lopp, who has been actively engaged in the production of anti-hog-cholera serum for the past eleven years, will have personal and direct supervision of our laboratories, which will be devoted exclusively to the production of throat-bled serum and virulent hog cholera virus.

We solicit the patronage of graduate licensed veterinarians only.

PEERLESS SERUM CO.

Cor. Lyons and Water Sts. **Kansas City, Kansas**

Post-Graduate Course

The Indiana Veterinary College

JANUARY, 1922

The following subjects, for which there is a demand for more information by established practitioners everywhere, will be taught: General Diseases of Swine, Dr. A. T. Kinsley; General Diseases of Cattle, Dr. T. H. Ferguson; General Surgery, Dr. L. A. Merillat; Diseases of Breeding Animals, Dr. W. L. Williams.

The faculty of the College will give assistance in every way.

The course will comprise two weeks beginning Jan. 16, 1922. It will be as practical, as up-to-date and as intensive as it is possible to make it. The cost will be moderate.

A post-graduate diploma will be issued to those satisfactorily acquitting themselves.

For Further Inform ion Address

Indiana Veterinary College

804 EAST MARKET STREET **INDIANAPOLIS, IND.**

To Stamp out Bovine Tuberculosis

THE UNITED STATES GOVERNMENT is conducting a campaign to eradicate tuberculosis in cattle, and the B. A. I. veterinarians can do only a small part of the actual testing. Practicing veterinarians should stand ready to co-operate to the fullest extent. They should be prepared to give their clients the best advice relating to the matter and they should keep a supply of Tuberculin on hand. We offer:

SUBCUTANEOUS TUBERCULIN.—Bio. 924: 20-cc rubber-diaphragm-capped bottle (5 doses). **Bio. 925:** 100-cc rubber-diaphragm-capped bottle (25 doses). Ready to use. Requires no dilution. Graduated dose table on the label.

INTRADERMIC TUBERCULIN.—Bio. 927: 1-cc vial (5 tests). **Bio. 928:** 5-cc vial (25 tests). Prepared to meet the increasing demand for check tests. Some veterinarians use this test almost exclusively.

OPHTHALMIC TUBERCULIN.—Bio. 923: Vial containing 10 discs. Dose already measured. A great convenience and a time-saver. Use this test in conjunction with the subcutaneous.

It is suggested that some one of the combination tests be employed.

Every lot of Tuberculin we manufacture is doubly tested for potency before release—first on guinea-pigs (the U. S. Bureau of Animal Industry method), and then in the field, under field conditions, on tuberculous cows. This is in addition to our usual sterility and safety tests.

Parke, Davis & Company

NEW YORK STATE VETERINARY COLLEGE

Established at NEW YORK UNIVERSITY by Chapter 670, Laws of 1913
FORMERLY NEW YORK-AMERICAN VETERINARY COLLEGE
(New York College of Veterinary Surgeons, Chartered 1857, and
American Veterinary College, Chartered 1875)

Four-Year Graded Course

Session 1921-1922 Began September, 1921

Applications for entrance received to September 29, 1922.

Free Scholarship to One Student from Each Assembly District
Laboratory Facilities and Clinical Advantages Excellent

Write for New Catalogue and All Information to the Dean
338 East 26th Street New York City

UNIVERSITY OF PENNSYLVANIA
SCHOOL OF VETERINARY MEDICINE
PHILADELPHIA

Offers a complete course in veterinary medicine extending over four sessions, each beginning the last Friday in September and ending the third Wednesday in June. Clinics and equipment unexcelled.

For Catalogue and Further information, address

LOUIS A. KLEIN, V.M.D. **Dean Veterinary Faculty**

School of Veterinary Medicine
AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS
College Station, Texas

Accredited by the American Veterinary Medical Association and the United States Department of Agriculture
Offers a four-year graded course leading to the degree of Doctor of Veterinary Medicine
Large hospital and ambulatory clinics
Tuition Free

For catalogue and other information, address, **Mark Francis, Dean**

Canine Distemper Mixed Bacterin

For prevention and treatment of Canine Distemper, our Bacterial Vaccine, in which we specialize, has some interesting advantages, both in content and pack.

The Moore method is economical and effective and has a long record of success. Detailed information, with prices, upon receipt of your address.

Middle Massachusetts Chemical Company
BIOLOGICAL LABORATORIES
Palmer, Mass.

THE OHIO STATE UNIVERSITY

College of Veterinary Medicine

COLUMBUS, O.

Offers a four-year graded course leading to the degree of Doctor of Veterinary Medicine. Unexcelled laboratory and clinical facilities. New buildings especially designed for teaching veterinary medicine according to the most approved modern methods. Faculty and specialists devoting whole time to teaching. For College Bulletins address

DAVID S. WHITE, Dean

NEW YORK STATE VETERINARY COLLEGE

ESTABLISHED AT

Cornell University, Ithaca, N. Y.

By Chapter 153, Laws of 1894

This college is well equipped with modern facilities for scientific and practical instruction for undergraduates. Most varied practice for students in the free clinics. Regular graded course, four years of nine months each. Entrance by Regents' "Veterinary Student Certificate," or by examination, September, 1922. Matriculation September, 1922.

Tuition Free to New York State Students

For extended announcement address,

Professor VERANUS A. MOORE, Director.

ST. JOSEPH VETERINARY COLLEGE

Accredited by Federal Government

Write for Catalogue

Address, St. Joseph Veterinary College, Dept. 3, St. Joseph, Missouri.

R. C. Moore, President **E. A. Logan, Dean**

MICHIGAN AGRICULTURAL COLLEGE

DIVISION OF VETERINARY MEDICINE

A well-equipped college, having excellent facilities for both scientific and practical instruction in a modern, four-year graded course of Veterinary Science, and leading to the degree of Doctor of Veterinary Medicine (D. V. M.) A new building especially designed for clinical and surgical instruction. an intimate relation with courses in Animal Husbandry and a faculty devoting its entire time to teaching offers unexcelled opportunities. Begins its thirteenth year September 28th, 1922.

Tuition free to residents of Michigan.

For college bulletins and information, address

F. W. CHAMBERLAIN, Dean, East Lansing, Michigan.

Anti-Anthrax Serum (Bovine)

Prepared from the Blood of Cattle

ESPECIALLY RECOMMENDED FOR USE IN DAIRY AND BREEDING CATTLE WHICH REQUIRE REPEATED VACCINATION AGAINST ANTHRAX

ANAPHYLACTIC reactions are being reported in cattle vaccinated against anthrax by the simultaneous method at yearly or more frequent intervals. Anti-Anthrax Serum prepared from the blood of horses was used in the cases under report.

Mulford Anti-Anthrax Serum (Bovine) is recommended for vaccinating cattle that are immunized repeatedly, by the simultaneous method. When this product is desired, be sure to specify "Anti-Anthrax Serum (Bovine)".

Anti-Anthrax Serum derived from the blood of horses has been used exclusively heretofore, and should be continued in use for the vaccination of horses, mules, sheep and all cattle that are not vaccinated repeatedly.

Dose 10 Cc. to 100 Cc.
Supplied in bottles containing 100 Cc.

CIRCULAR AND PRICES UPON REQUEST

H. K. MULFORD COMPANY, Philadelphia, U. S. A.

51000

Mulford

THE PIONEER BIOLOGICAL LABORATORIES

Lederle

ANTI-HOG CHOLERA SERUM

$1.75 PER HUNDRED

Sold to Veterinarians Only Postage or Express Prepaid

25%

more immunizing value than whole blood

more immunizing value than Watered Clear Serum

These statements based on tests made by Bureau of Animal Industry Washington

LEDERLE ANTITOXIN LABORATORIES

NEW YORK - - - - - 511 Fifth Avenue
CHICAGO - - Marshall Field Annex Building
KANSAS CITY - - - 601 Firestone Building
NEW ORLEANS - - - 105 Medical Building
MINNEAPOLIS - - - - 633 Andrus Building
SAN FRANCISCO - - - - 163 Jessie Street

A NEW
Lederle
PRODUCT

Canine Rabies Vaccine

For the eradication
of Rabies in Dogs

One Injection Method

More than 31,000 dogs have been
immunized by this method

PRICE: $2.50 per package

Write for Booklet

LEDERLE ANTITOXIN LABORATORIES

NEW YORK - - - - - - 511 Fifth Avenue
CHICAGO - - Marshall Field Annex Building
KANSAS CITY - - - 601 Firestone Building
NEW ORLEANS - - - 105 Medical Building
MINNEAPOLIS - - - - 633 Andrus Building
SAN FRANCISCO - - - - 163 Jessie Street

Tuberculosis

THE control of tuberculosis is at the present time a most acute problem. The campaign against this scourge is being pushed with a concerted effort by all interested in the livestock industry.

Successful control depends on the early and accurate diagnosis of the disease, which can only be accomplished by the aid of potent, reliable tuberculin. The tuberculins produced by the LEDERLE ANTITOXIN LABORATORIES have always proven potent and reliable; therefore, the maximum accuracy is obtained in the reactions from their use.

We recommend the following tuberculin preparations:

Subcutaneous Tuberculin for thermic tests.

Special Tuberculin for the intradermal, intrapalpebral and ophthalmic tests.

Tuberculin Discs for the ophthalmic test.

LEDERLE ANTITOXIN LABORATORIES
511 FIFTH AVENUE
NEW YORK CITY

VETERINARY ASSOCIATIONS

Secretaries of Veterinary Associations are requested to cooperate with us in keeping this directory up to date.

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y.
Alabama Vet. Med. Ass'n		Auburn	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.		Columbus	W. R. Hobbs, care O. S. U., Columbus, Ohio
Alumni Ass'n N. Y.-A. V. C.	Sept., Dec., Mar.	338 E. 26th St.	Adolph Eichhorn, Pearl River, N. Y.
American Vet. Med. Ass'n			N. S. Mayo, 4753 Ravenswood Ave., Chicago
Arkansas Veterinary Ass'n			R. M. Gow, Little Rock.
B. A. I. Vet. In. A., S. Omaha	3d Mon.each mo.	S. Omaha, Neb.	J. V. Giffee, So. Side, Omaha
B. A. I. Vet. Ass'n, Metro Div.		338 E. 26th St.	
British Columbia Vet. Ass'n			K. Chester, New Westminster, B. C.
California State V. M. Ass'n	June	Fresno	J. P. Bushong, Los Angeles
Central Canada V. Ass'n			C. H. Weaver, Ottawa
Central Mich. V. M. A.		Jackson	W. N. Armstrong, Concord
Central N. Y. Vet. Med. Ass'n.	June and Nov.	Syracuse	W. B. Switzer, Oswego
Chicago Vet. Society	2d Tu. each mo.	Chicago	J. Jaffray, Chicago
Colorado State V. M. Ass'n			I. E. Newsom, Ft. Collins
Conestoga Veterinary Club	2d Thur.each mo	Lancaster, Pa.	H. B. Brady
Connecticut V. M. Ass'n			G. E. Corwin, Hartford
Dominion Vet. Meat Inspectors' Ass'n of Canada	3d Sat. each mo.	Toronto	Wm. Tennant, Toronto
Eastern Iowa Vet. Ass'n		Muscatine	S. E. Houk, Muscatine
Genesee Valley V. M. Ass'n		Rochester	J. H. Taylor, Henrietta,N.Y.
Georgia State V. M. A.	Sept. 20-21	Albany	Peter F. Bahnsen, Americus
Hudson Valley V. M. A.			W. H. Kelly, Albany
Idaho Ass'n Vet. Graduates			C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n		Collinsville, Ill.	L.B.Michael, Collinsville, Ill.
Illinois State V. M. Ass'n			L. A. Merillat, Chicago
Indiana Veterinary Ass'n			G. H. Roberts, Indianapolis
Iowa Veterinary Ass'n	Jan. 17-19, 1922.	Ames	H. D. Bergman, Ames
Kansas State V. M. Ass'n			W. J. Guilfoyle, Kansas City
Kentucky V. M. Ass'n		Louisville	H. Gieskemeyer, Ft. Thomas
Louisiana V. M. Ass'n			E. I. Smith, Baton Rouge
Maine Vet. Med. Ass'n		Bangor	P. R. Baird, Waterville
Massachusetts Vet. Ass'n	Monthly	American House Boston	Harrie W. Peirce, W. Med'd
Michigan-Ohio V. M. A.		Adrian	W. E. Watson, Metamora, O.
Michigan State V. M. Ass'n	Feb. 7-8, 1922.	East Lansing	R. A. Runnells, E. Lansing
Minnesota State V. M. Ass'n	Jan. 12-13, 1922.	St. Paul	C. P. Fitch, St. Paul
Mississippi State V. M. Ass'n	Jan. 23-24, 1922.	Gulfport	J. A. Barger, Jackson
Missouri Valley V. Ass'n		Omaha, Neb.	R.F.Bourne, Ft.Collins, Colo.
Missouri Vet. Med. Ass'n			Chas. D. Folse, Kansas City
Montana State V. M. A.			N. T. Gunn, Bozeman
Nat'l Ass'n B. A. I. Veterinarians	Meet with A V. M. A.		S. J. Walkley, 945 39th St., Milwaukee, Wis.
Neb. Vet. Med. Ass'n		Grand Island	C. J. Norden, Lincoln
Nevada State Vet. Ass'n		Reno	Lewis H. Wright, Reno, Nev.
New York S. V. M. Society		Syracuse	C. R. Hayden, Ithaca
North Carolina V. M. Ass'n			J. P. Snoon, Burlington
North Dakota V. M. Ass'n			R. S. Amadon, Fargo
Northwestern Ohio V. M. A.			C. E. Hershey, Tiffin, Ohio
Ohio State V. M. Ass'n	Feb. 2-3	Columbus	F. A. Lambert, Columbus, O.
Ohio Tri-County Vet. Ass'n			W. R. Lukens, Hillsboro
Ohio Valley Vet. Med. Ass'n			C. S. Henry, Terre Haute
Oklahoma State V. M. Ass'n		Okla. City	H. Wood Ayers, Okla. City
Ontario Vet. Ass'n		Toronto	J. S. Glover, Toronto
Orange Belt V. M. A.	2d Tu. each mo.		Hal C. Simpson, Pomona
Orleans Parish V. M. A.	1st Tu. each mo.	New Orleans	W. J. Ratigan, New Orleans
Oregon Vet. Med. Ass'n			R. T. Simms, Corvallis, Ore.
Pennsylvania State V. M. A.	Jan. 24, 25, 1922.	Harrisburg	R.M. Staley, P. O. 1404, Phila.
Philadelphia Veterinary Club	4th Tu. ea. mo.	Philadelphia	C. S. Rockwell, 5128 Chestnut St., Philadelphia
Philippine Vet. Med. Ass'n			A. K. Gomez, Manila
Portland Vet. Med. Ass'n	4th Tu. ea. mo.	Portland, Ore.	Sam B. Foster, Portland, Ore.
San Joaquin V. M. A.	1st Wed. mo.		H. B. Winthringham, Fresno
S. Carolina Ass'n of Veter'ns		Union	T. B. Jacobs, Newberry
Schuylkill Valley V. M. A.		Reading	C. B. Potteiger, Reading
South Dakota V. M. A.			S. W. Allen, Watertown
So. Calif. V. M. A.	3d Wednesday. Monthly	Los Angeles	J. P. Bushong, Los Angeles
Southeastern Mich. V. M. Ass'n	2d Wednesday. Jan.Apr.Jul.Oct.		H. Preston Hoskins, Detroit
Southeastern States V. M. A.			J. I. Handley, Atlanta
Southern Tier V. M. A.		Binghamton	R. R. Birch, Ithaca, N. Y.
Southwestern Mich. V. M. A.			L.A.Winter,Eau Claire,Mich.

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y.
Tennessee Vet. Med. Ass'n. ..	.....	.....	F. R. Youree, Lebanon
Texas State V. M. A.....	June each year.	Fort Worth ...	H. L. Blackburn, Ft. Worth
Utah Vet. Med. Ass'n.....	Oct. each year.	Salt Lake City.	E. A. Bundy, Ogden
Vermont Vet. Med. Ass'n....	.....	.....	G. Stephens, White River J'n
Vet. Ass'n of Alberta.....	July and Dec.	.....	T. E. Leclaire, Calgary, Alta.
Vet. Club Dist. of Columbia...	.....	.....	F.W.Grenfell, Wash'n, D. C.
Vet. Ass'n of Manitoba.....	.....	Winnipeg	Wm. Hilton, Winnipeg
Vet. Med. Ass'n of N. J.....	Jan. 12, 1922...	Trenton.....	R. W. Butterworth, Paterson
V. M. Ass'n, New York City...	1st Wed. ea. mo.	338 E. 26th St..	Dr. J. E. Crawford, Far Rockaway, N. Y.
Virginia State V. M. Ass'n....	Jan. 12. 13....	Richmond.....	W.G.Chrisman, Blacksb'g,Va.
Washington State Col. V. M. A.	1st, 3d Fri. eve.	Pullman	John H. Gooding, Pullman
Washington State V. M. A....	July 14-15	Seattle	Carl Cozier, Bellingham
Western N. Y. V. M. A.....	.....	Buffalo	F. F. Fehr, Buffalo
Western Pa. Vet. Club.....	3d Tu. each mo.	Pittsburgh	Fred Wietzel, Pittsburgh
W. Virginia Vet. Med. Ass'n..	July, annually.	.....	C.T.Higginbotham,Charleston
Wisconsin Vet. Med. Ass'n....	.....	.....	W. A. Wolcott, Madison
York Co. (Pa.) V. M. A.....	July 6 and 7..	York	E. S. Bausticker, York, Pa.

VETERINARY PRACTICES, POSITIONS, ETC., furnished and handled for sale in 48 States. Physicians, dentists and nurses furnished and located. Drug stores for sale and drug positions in all States. F. V. Kniest, Peters Trust Bldg., Omaha, Neb. (Guaranteed Service.) Established 1904.

F. V. KNIEST, Omaha, Nebr., is still after business in his 18th year. If you want to sell, want to buy, or want a position, or need a Veterinarian, write him for terms of guaranteed service. All States covered. Special plans. Gilt edge references. No obligation in writing him your wants. Address F. V. Kniest, Peters Trust Bldg., Omaha, Nebr.

WANTED.—General Practice or partnership, city or rural, by a graduate of 13 years' experience. Age 33. Familiar with all branches of medicine. Would consider commercial traveling. References. Apply G, care of Journal.

VETERINARY SURGICAL INSTRUMENTS REPAIRED—Regardless of condition, we make new parts, sharpen knives and scissors, nickel-plate, clean and polish. Send in your RUSTY instruments. Christian Schlicker Mfg. Co., 12 Bloomingdale St., Rochester, N. Y.

We wish to mention the fact that the business of the Veterinary Specialty Company, formerly conducted at Holland, Michigan, has been transferred to Chicago, Illinois, their new address being 531 South Peoria Street. No change in the management of the business is being made, but the location is being changed on account of Chicago offering a much wider field for their activities.

LET US TAN YOUR HIDE.

Horse or Cow hide, Calf or other skins **with hair or fur on,** and make them into coats (for men and women), robes, rugs or gloves when so ordered, or we can make your hides into Oak Tanned **Harness Leather,** making it into work harness when so ordered; or make **Slaughter Sole Leather.**

We can tan **your calf skins into Shoe Leather,** giving them an elegant grain finish in Gun Metal, Mahogany Russet or lighter shade.

Your goods will cost you less than to buy them and be worth more.

Our illustrated catalog gives a lot of information. It tells how to take off and care for hides; how and when we pay the freight both ways; about **our safe dyeing process** on cow and horse hide, calf and other skins; about the fur goods and game trophies we sell, taxidermy, etc.

Our Fashion Book, which heretofore has been a separate affair, has been incorporated in and made a part of our regular catalogue. **It has Fashion plates** of muffs, neckwear and other fine fur garments; also remodeling and repairing, together with prices and estimates. In ordering catalog, write name and address plain.

The Crosby Frisian Fur Company,
571 Lyell Ave., Rochester, N. Y.

Just Enough

and just as they want it. The right way to salt animals is to let them help themselves.

Compressed Pure-Salt Bricks

in our Patent Feeders, supply refined dairy salt. They mean animal thrift. They cost but little. Convenient for you and your animals suffer no neglect. Ask your dealer and write us for booklet.

Belmont Stable Supply Co.
Patentees, Mfrs.
Brooklyn, N. Y.

B--D
Veterinary Thermometers

NO. 230 BERKSHIRE

A special Thermometer designed for those working among swine.

No. 345 MONARCH

A general utility Veterinary Thermometer of the highest quality.

Shown above are two of the thirty-four different B-D Veterinary Thermometers listed in our 1922 Catalogue. Ask for a copy and use it to identify for your dealer the brand, size and design of thermometer you wish him to carry in stock for you. All are guaranteed accurate.

BECTON, DICKINSON & CO.

RUTHERFORD, NEW JERSEY

Makers of B-D Veterinary Thermometers, CHAMPION Syringes and Needles, MONARCH Milking Tubes and B-D Cattle SPECIALTIES

ANNOUNCING

the

REORGANIZATION

and

EXPANSION

of the

QUALITY BIOLOGIC CO.

We have reorganized by purchasing all the interests held in the Quality Biologic Company by Drs. C. D. Folse, W. G. Keehn, and Mr. L. M. Curts.

WE HAVE EXPANDED

By purchasing the business of the GOEBEL SERUM COMPANY.

By putting in a stock of VETERINARY INSTRUMENTS, and SPECIALTIES.

By adding NEW PRODUCTS to the list of the efficient, Quality Bacterin.

By establishing a "WANTS HOUSE" for Veterinarians only.

Where he can procure Instruments, Specialties, Hog Cholera Serum and Virus, Antitoxins, Antiserums, Blackleg Filtrate and Aggressin, Anthrax Vaccines, Bacterins and Diagnostic Agents.

By establishing a "VETERINARY SERVICE STATION" where Dr. Logan will be pleased to make laboratory diagnoses for our patrons. He is at your service.

WITH A GUARANTEE OF SATISFACTION TO YOU we solicit your patronage.

QUALITY BIOLOGIC CO.

The people who put the "ACT" in Bacterins

86-88 North James St.
Kansas City, Kansas

G. A. Johnson, D. V. M.,
Pres. and Manager.

E. A. Logan, D. V. M.,
Laboratory Director

C. H. Goebel,
Vice-Pres. and Sales Mgr.

C. E. Lawrence,
Secretary and Treasurer.

Phone Main 3138

To protect your own interests use

Eagle Anti-Hog Cholera Serum and Virus with Eagle Mixed Infection Bacterin

EAGLE LABORATORIES

Kansas City, Kans. Oklahoma City, Okla. Nashville, Tenn

Special Sterility Requisites

UTERINE CAPSULES

Composed of iodoform, boracic acid and thymol

Per dozen capsules	$2.00
Per gross capsules	20.00

METRITIS MIXED BACTERIN (Bovine)

Per package of 6-2 mil vials	$1.00
Per package of 12-2 mil vials	2.00
Per 20 mil vial (10 doses)	1.20

BOVINE ABORTION BACTERIN (Mixed)

Per package of 10-10 mil vials	$4.50
Per vial 100 mils (10 doses)	4.00
Per vial 200 mils (20 doses)	7.50

These are helping to answer the sterility problems in extensive cattle practices. We have many others in which you may be interested. Literature and list on application. We are headquarters for Sterility needs, Biologicals, Pharmaceuticals and Instruments.

GOSHEN LABORATORIES, Inc.

GOSHEN NEW YORK

Announcement

The United Serum Company desires to inform the profession of the following reorganization in the administration of its consolidated companies:

DR. J. E. BROOKS, President

DR. H. E. CURRY, Vice-President

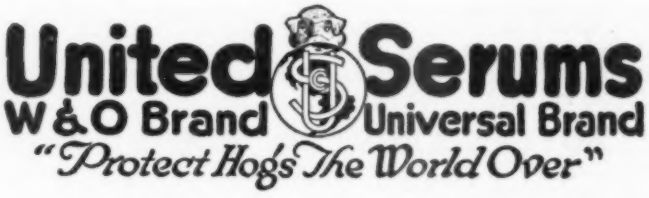
DR. J. D. THROWER, Production Manager, Kansas City Plant

DR. H. R. SCHWARZE, Vice-Pres. and Mgr. of Production, East St. Louis Plant

---

DR. J. R. SEVERINS, Production Manager, Wichita Plant

The high quality and service will be maintained as heretofore on the famous W & O and Universal Brands.



THE UNITED SERUM COMPANY

KANSAS CITY, KANS.

East St. Louis, Ill. **Wichita, Kans.**

To the Profession

In this era of better stock raising, of wide reading, of enlightened thought and increased leisure on the farm, of community interest in health, sanitation, crop and stock conditions, the veterinary profession is able to serve constructively in the cause of Disease Prevention.

With the aid of this new science, the veterinarian now forestalls disease by promoting health, insures property by preventing losses before they threaten, strengthens finances by making investment secure, and thus contributes to the general prosperity and well-being of community as well as individual.

In his exalted task he is destined to be no longer an emergency practitioner only but rather community mentor and counsel permanently retained by every owner of growing, healthy herds.

Our products are distributed—to the profession—through the following channels:

W. J. Balzer,
Peoria, Ill.

Great Western Serum Co.,
830 Exchange Ave., Chicago, Ill.

C. B. McClelland,
833 West 6th, Des Moines, Ia.

Peoria Serum Co.,
Peoria, Ill.

Swan-Myers Co.,
Indianapolis, Ind.

Iowa Vet. Supply Co.,
Des Moines, Ia.

United Serum Co.,
Columbus, Ohio.

Kentucky Serum Co.,
409 So. Jackson, Louisville, Ky.

Merrinian Medical Supply Co.,
St. Paul, Minn.

Southeastern Labs.,
Atlanta, Ga.

Wichita-Oklahoma Serum Co.,
Oklahoma City, Okla.

Wilmer Vet. Supply Co.,
Memphis, Tenn.

United Serum Co.,
Waterloo, Ia.

Universal Serum Company,
East St. Louis, Ill.

United Serum Co.,
Danville, Ill.

United Serums

W&O Brand Universal Brand

"Protect Hogs The World Over"

THE UNITED SERUM COMPANY

KANSAS CITY, KANS.

East St. Louis, Ill. **Wichita, Kans.**

RESPONSIBILITY

We produce FORT DODGE CLEAR SERUM from start to finish right on our own premises—no guess-work enters into its manufacture.

WE KNOW

that the whole blood we produce is highly potent because WE KNOW we inoculate our "Hyper-immunes" with intensely virulent virus which is bound to produce a serum high in anti-bodies.

WE KNOW

that this whole blood is handled in such a way that it is either entirely sterile when turned over to our Clear Serum department or else has such a very low bacterial count as to be entirely negligible. This gives us a great start toward the production of a Pure Potent CLEAR Serum. If we did not produce our own whole blood and had to buy it on the serum market where we could purchase it to advantage, then we should have to take someone else's word for the purity and potency of the whole blood so procured; we should have to content ourselves with simply clarifying the whole blood produced on other premises; and we could not possibly take the interest in, nor stand back of, the product to the extent that we do with our own CLEAR Serum which we manufacture from beginning to end.

WE STAND BACK

of every drop of FORT DODGE Clear Serum, KNOWING as we do that the virus, the blood serum, the swine, the technique, the equipment, the knowledge, and all else entering into its manufacture represent the highest degree of perfection and are RIGHT in every particular.

FURTHER—

in addition to the prescribed U. S. Government tests, FORT DODGE Clear Serum is subjected by us to microscopic examinations and animal inoculation tests to prove beyond a shadow of doubt that our product is free from any filtrable viruses or pathogenic bacteria.

Insist upon using FORT DODGE Clear Serum—The Clear Serum that has made good upon thousands of swine during the past two years.

FORT DODGE SERUM COMPANY

Fort Dodge **Iowa**

Dr. G. I. Blanchard, Pres. and Sales Manager.

Dr. E. B. Hollecker, Vice-Pres. and Laboratory Supervisor.

Dr. Phillip Ritter, Chief Veterinarian

Better Anti-Hog Cholera Serum is made The Missouri Valley Serum Co. makes it

Because It's Throat Bled

OUR BRANCHES

Missouri Valley Serum Company, 646 No. Main St., Dayton, Ohio
Dr. T. W. JOHNSTON in charge

Missouri Valley Serum Company, 412 Pennway Bldg., Indianapolis, Ind.
Dr. L. E. NORTHRUP in charge

Missouri Valley Serum Company, 610 So. 3d St., Evansville, Ind.
Dr. G. J. BEHRENS in charge

Missouri Valley Serum Company, Foot of South St., Peoria, Ill.
Dr. J. F. ROSER in charge

Missouri Valley Serum Company, 636 E. Grand Ave., Des Moines, Iowa
Dr. E. W. HANSON in charge

Acme Chemical Company, 474-476 Edison St., Milwaukee, Wis.

Roy Dickerson, 300 Broadway, Logansport, Indiana.

Dr. D. D. Dragoo, Rushville, Indiana

Order from the Branch Nearest You

A supply of fresh Throat Bled Serum and Virus, also a full line of veterinary biologics and instruments for their administration are carried on hand at all times by the above Branches.

Your orders will be given prompt attention.

MISSOURI VALLEY SERUM COMPANY

50 North 2d Street **Kansas City, Kansas**

SWAN-MYERS

Hemorrhagic Septicemia Bacterins

The prevention and treatment of Hemorrhagic Septicemia with bacterins has given most encouraging results. The early use of the proper bacterin will, in most cases, prevent the appearance of the disease even in those which have been exposed, while the early administration of large doses to infected animals commonly results in a lowered temperature, a marked improvement, and a rapid recovery.

Swan-Myers Hemorrhagic Septicemia Bacterins are prepared by the same staff of highly trained bacteriologists and under the same methods and controlled by the same rigid tests that have obtained the marked success of Swan-Myers Bacterins for human use.

The following bacterins are indicated as a prophylactic and treatment for Hemorrhagic Septicemia in its various forms:

Bovine Hemorrhagic Septicemia Bacterin No. 113

Mixed Infection Bacterin for Swine No. 116
(Complicated Hemorrhagic Septicemia)

Avian Hemorrhagic Septicemia Bacterin No. 122

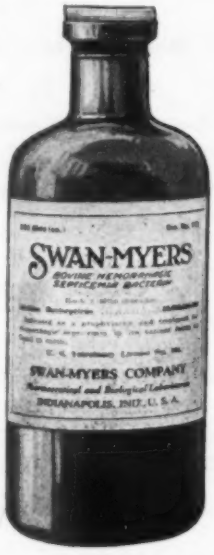
Swine Plague Bacterin No. 115
(Hemorrhagic Septicemia in Swine)

Equine Hemorrhagic Septicemia Bacterin No. 118

Ovine Hemorrhagic Septicemia Bacterin No. 117

Prepared in 20 mil (Cc.) bulk packages at $1.20 and 100 mil (Cc.) bulk packages at $5.00

U. S. Veterinary License No. 104



SWAN-MYERS COMPANY

Pharmaceutical and Biological Laboratories

INDIANAPOLIS, U. S. A.

COOPER'S

COOPER GUARANTEED PRODUCT

Saponified Cresol Solution

50% PURE CRESOL

An officially approved substitute for Liquor Cresolis Compositus in disinfection work under B. A. I. control

Willm. Cooper & Nephews

152 W. Huron St. Chicago, Ill.

Established 1843

SATISFACTION

Thousands of Veterinarians Continue to Use

SIOUX BRAND SERUM AND VIRUS

There is a reason
THE SERUM OF NO REGRETS
A *Trial Order* will convince you—Produced by

Sioux City Serum Company

Sioux Brand

Pioneer Producer of Potent Serum and Virulent Virus
U. S. Veterinary License No. 37

MAIN OFFICES AND LABORATORIES, Sioux City, Iowa

BRANCH OFFICES

Des Moines, Iowa, 608 Observatory Bldg.
St. Joseph, Mo., Riordan & Co., 10-11 Rock Island Bldg.
Peoria, Ill., Dr. C. B. Simmons, Mgr., 113 Depot St.
East St. Louis, Ill., White Cross Serum Co., Dr. C. B. Simmons, Mgr., 800 St. Clair Ave.
Indianapolis, Ind., Dr. C. B. Simmons, Mgr., 309 Saks Bldg.
Lima, Ohio, F. M. Vosburgh, 227 So. Peirce St.
Columbus, Ohio, F. M. Vosburgh, Mgr., 229 W. 8th Ave.

JEN-SAL BIOLOGICS.

The Cutter Laboratory

(U. S. Veterinary License No. 52)

Watch this inner square each month

for

A few interesting facts and figures

Blackleg Aggressin

Sediment in Blackleg Aggressin has no immunizing value.

Tests prove that 5 cc. of Aggressin (not aggressin plus sediment) is the required dose.

Cutter's Blackleg Aggressin is **sediment free** and **germ free.**

	Net price to Veterinarians
Cutter's Blackleg Aggressin (10 dose bottle)	**$1.50**
Cutter's Blackleg Aggressin (50 dose bottle)	**7.50**

Cutter's Aggressin is **sediment free** and **germ free**

You will get results with Cutter's when others fail.

Depots of the Cutter Laboratory

Berkeley, Calif.	Laboratory and Main Office.
Chicago, Ill.	Eastern Branch.
Los Angeles, Calif.	624 San Fernando Bldg.
New Orleans, La.	525 Carondelet St.
San Antonio, Tex.	217 Eleventh St.

Facilities for quick service and proper refrigeration maintained at the above depots

It has been scientifically established through the research work of the Department of Animal Pathology and Hygiene at the University of Illinois that

BOTULINUS INTOXICATION

Is One of the Most Common and Important Swine Diseases

The symptom-complex of botulinus poisoning in swine is variable, depending on the age of the animal and the extent of the contamination. No doubt many cases of swine botulism have been incorrectly diagnosed as Mixed Infection, Infectious Enteritis, Swine Plague, Swine Pneumonia and Necrobacillosis.

Jen-Sal

Botulinus Antitoxin

A—Type for Swine

Has proven a valuable agent to offset the intoxication caused by the botulinus toxin, a condition that frequently follows immunization with anti-hog cholera serum and virus. Botulinus intoxication may appear independent of hog cholera on badly contaminated premises.

The prophylactic dose, 500 units, 5-mil; curative dose, 1,000 units, 10-mil; repeated at two or three-day intervals if necessary.

Code Word		
Agree	Per vial 20 mil (4 doses).....	$1.00
Agone	Per vial 200 mil (40 doses).....	10.00

Complete literature supplied on request.

JENSEN-SALSBERY LABORATORIES

21st and Penn., Kansas City, Missouri

For Small-Animal Practice

The newest and most practical innovation is the

Strasco Jr.

With Automatic Tray

It has won instant favor with small-animal practitioners and general practitioners who like to keep their medicine and supplies for small-animal practice conveniently ready for immediate use.

Built like our popular STRASCO, it is durable, good looking, and arranged correctly. Size 16 inches long, 7 inches high, and 6¼ inches wide.

Price, $15.00 filled; $7.00 empty, with three trays.

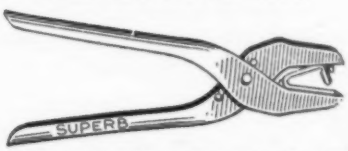
Let us send literature and further information about this popular new case. It's just the thing for small-animal practice.

R. J. STRASENBURGH COMPANY

ROCHESTER Manufacturing Chemists since 1886 **NEW YORK**

"SUPERB" EAR TAG

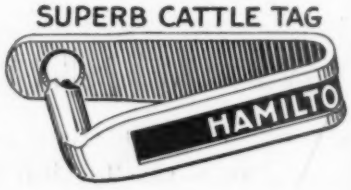
"THE HUMANE TAG"



Cuts a Round Plug Out of the Ear, Inserts the Tag and Rivets It in One Operation

Can Be Used But Once

For Cattle, Sheep and Hogs



Each Tag has space for Name, Address and Number

Manufactured and Sold by

THE SACHS-LAWLOR CO., INC.

1543 Larimer St., Denver, Colorado

Ether Vaporizing Outfit for the Treatment of Mastitis in Cattle, as used and devised by A. T. Peters, D. V. M., Peoria, Illinois

The treatment consists in etherizing the udder, which technique is almost the same as that used in treatment of milk fever, only that the ether is not injected into the quarters (but that it is allowed to be vaporized into the quarters). This is accomplished by inserting a milk tube into the quarter affected, to which a rubber tubing has been attached and to the other end of this tubing a metal cylinder. The ether is poured into the metal cylinder, then immersed in boiling water, which will cause an almost instant vaporization. This way allows the ether vapor to penetrate through the entire quarter affected. To prevent the escape of the ether vapor tie tape around the entrance of quarter.

Dr. Peters has had very satisfactory results from this method due to the fact that ether has a powerful germicidal effect and that the vapors of ether penetrate into every crevice of the udder, thereby destroying the growth and multiplication of the germs.

For complete details covering this treatment refer to *The Vitamineral News,* Volume 1, Number 2, dated August, 1921.

Outfit consists of a heavy brass, nickel-plated cylinder, two ounce capacity, to which is attached six feet of tubing of proper size and attached thereto a self-retaining milk tube.

Price of Outfit Complete - - - - $2.00

SHARP & SMITH

Manufacturers and Exporters of High-Grade Veterinary Surgical Instruments and Hospital Supplies

65 E. LAKE STREET, CHICAGO, ILLINOIS

Established 1844 **Incorporated 1904**

Here's the Big News We've Long Been Wanting to Send You

A drastic reduction in the price of Alexander Clear Serum brings this peer of all serums down to a cost figure only a trifle more than common blood serum and places it in line for universal use, not only by the owners of pure bred hogs, but also by the owners of large market herds and feeders, as well.

Until Further Notice Your Orders for Alexander Clear Serum Will Be Filled at the New Net Rate to the Profession of only $1.35 Per 100 C.C.

The product carries the same unqualified guarantee as to purity, potency and dependability—the pioneer in America of all clear serums, the product which has founded the greatest institution of its kind and the product which still holds unchallenged first place in its important field.

Every day adds to the popularity and nation-wide usage of this serum, and, as you doubtless already have learned, the majority of all the great champions of the National Swine Show this year were vaccinated with Alexander Serum.

Now with this materially reduced price in effect, your field will be vastly greater and the demand for your services proportionately increased as you can vaccinate with this superior serum at a cost of only 1c to 2c per hog more than if you used the old-style common blood serum.

We are in better position than ever before to give you 100% service in the handling of your rush orders and in lending every desired coöperation.

We solicit your further orders at any hour, day or night, by letter, telephone or wire to your nearest distributor or direct to us.

DISTRIBUTORS

GEORGIA

South Eastern Laboratories, Atlanta

KANSAS

Goebel Serum Co., Kansas City.

INDIANA

L. T. Williams Serum Co., Indianapolis, 122 East Ohio St.

IOWA

D. S. McDermid, Muscatine.

ILLINOIS

Middle West Laboratories, Bloomington, 200 Eddy Bldg.

NEBRASKA

Dr. Paul Jucknless, Omaha.

OHIO

Dr. Wm. Henry, Jamestowr.
D. Bourne, Hamilton, Rentsheller Bldg.
Dr. Walter Brown, Columbus, 220 Champion Street.

SOUTH DAKOTA

Mineral Nutrition Co., Aberdeen.
Sioux Falls Serum Co., Sioux Falls.

WISCONSIN

Dr. W. A. Wolcott, Madison.

ALEXANDER CLEAR SERUM CO.

KANSAS CITY **MISSOURI**

A PAGE
from

100 THE BOOK OF EXPERIENCE

NOT everything good is new, not everything new is good. Many medicinals which have been in use for ages will undoubtedly remain standard for all time to come.

Vaporol (Abbott) consists of drugs of this type. It is an elegant new combination of volatile aromatic respiratory antiseptics prepared for use by inhalation with hot water (steaming). It is not a secret formula but has been in use by a successful practitioner for years. Indicated in equine influenza, canine distemper, etc. A real wonder worker. In pint bottles at $1.31 net, each.

THE ABBOTT LABORATORIES

Dept. 30, 4739-53 Ravenswood Ave., Chicago

31 E. 17th St., New York. 559 Mission St., San Francisco.
225 Central Bldg., Seattle.
Toronto. Bombay.

MINERAL-VITOL

(AMVETSCO)

Decreases abortion and sterility, overcomes malnutrition, prevents rickets, "breaking down in the back," enlarged joints, lameness and related conditions. Increases milk flow.

Scientifically Correct

Mineral-Vitol contains the essential mineral elements that are intimately involved in maintaining the proper equilibrium of the body fluids, combined with vitamines in such form for easy assimilation.

Profitable Results

Will follow the use of Mineral-Vitol. The many reports received following its use have been eminently satisfactory. The veterinarian will not only increase his profits by recommending Mineral-Vitol but his clients as well.

Prescribe Amvetsco Mineral-Vitol

Per 5-lb. carton	$0.90
Per 20 5-lb. cartons	16.00
Per 50-lb. drum	6.75
Per 100-lb. drum	12.50

WRITE FOR FURTHER PARTICULARS

AMERICAN VETERINARY SUPPLY CO.
Kansas City, Mo.

Indianapolis, Ind. **St. Paul, Minn.** **St. Louis, Mo.**

PASTEUR LABORATORIES OF AMERICA

BIOLOGICAL PRODUCTS

THERE HAS NEVER BEEN ANY QUESTION ABOUT THEIR ABSOLUTE SUPERIORITY. WHY NOT USE THE BEST?

Pasteur's original and genuine *Anthrax Vaccine* is now furnished in single and double treatment. It positively prevents anthrax.

Profs. Leclainche & Vallée's Liquid Blackleg Vaccine is a true and perfectly attentuated vaccine, and has revolutionized live stock vaccination. Why risk your professional reputation with makeshift blackleg vaccine?

Full information regarding the above, as well as Tuberculin, Mallein, Intra-Dermo Palpebral Malleination, Antitetanic and Antistreptococcic Serum, etc., furnished on request.

Pasteur Laboratories of America

New York, 366-368 W. 11th St.

Laboratoire des Vaccins Pasteur pour l'Etranger and Institute Pasteur, Paris, France, Biological Products.

Diseases of the Genital Organs of Domestic Animals

By W. L. WILLIAMS

Professor Emeritus, formerly Professor of Obstetrics and Research Professor of the Diseases of Breeding Cattle, in the New York State Veterinary College at Cornell University.

Eight hundred and seventy-four pages, eight colored engravings, and two hundred and forty illustrations in text. The only comprehensive treatise on the subject in any language. 1921. Price, $10.00.

By the Same Author

Veterinary Obstetrics

Six hundred and fifty pages, three colored plates, and one hundred and forty illustrations in text. Universally recognized as the foremost authority. 1917. Price $5.00.

Surgical and Obstetrical Operations

Two hundred and six pages with seventy-four illustrations. Fourth Edition. 1919. Price, $3.00

The books in the above list are not sold at discount to dealers. All orders should be addressed, with remittance, to W. L. WILLIAMS, Ithaca, N. Y.

FRED GROSS, D. V. M., Pres. Sales Manager.
C. D. NEWHART, D. V. M., Vice-Pres. Superintendent of Production.
M. J. FARBER, M. D., Sec'y. and Treas.

REX

Veterinarians!

SERUM AND VACCINE CO.

Assures You on Its Merit in Service, Purity and Potency

Laboratories and Office West of Lake and Alabama Aves.

Address: P. O. Box 86, Station D., St. Joseph, Mo.

PRODUCERS and DISTRIBUTORS ANTI-HOG-CHOLERA SERUM and HOG CHOLERA VIRUS

U. S. Veterinary License No. 154

POLICY—We Solicit the Patronage of the Veterinary Profession Only

We handle a full line of Veterinary Biologics

PHONE, WRITE, WIRE US YOUR ORDERS

If you have not made your contracts for 1921 or future, write us today.

REX SERUM and VACCINE CO.

P. O. Box 86, Station D. St. Joseph, Mo.

ANNOUNCING
the Organization of the
PEERLESS SERUM CO.

of Kansas City, Kansas

U. S. Vet. License No. 168

We wish to announce to the veterinary profession the organization of the Peerless Serum Company. Walter J. Lopp, D. V. S., formerly President of the Universal Serum Co., of East St. Louis, Ill., together with Mr. C. L. Charles, formerly President of the United Serum Co., have organized the above named company.

Dr. Lopp, who has been actively engaged in the production of anti-hog-cholera serum for the past eleven years, will have personal and direct supervision of our laboratories, which will be devoted exclusively to the production of throat-bled serum and virulent hog cholera virus.

We solicit the patronage of graduate licensed veterinarians only.

PEERLESS SERUM CO.

Cor. Lyons and Water Sts. **Kansas City, Kansas**

Post-Graduate Course

The Indiana Veterinary College

JANUARY, 1922

The following subjects, for which there is a demand for more information by established practitioners everywhere, will be taught: General Diseases of Swine, Dr. A. T. Kinsley; General Diseases of Cattle, Dr. T. H. Ferguson; General Surgery, Dr. L. A. Merillat; Diseases of Breeding Animals, Dr. W. L. Williams.

The faculty of the College will give assistance in every way.

The course will comprise two weeks beginning Jan. 16, 1922. It will be as practical, as up-to-date and as intensive as it is possible to make it. The cost will be moderate.

A post-graduate diploma will be issued to those satisfactorily acquitting themselves.

For Further Information Address

Indiana Veterinary College

804 EAST MARKET STREET **INDIANAPOLIS, IND.**

PAGES
MISSIN
ARE
AV

NG
E NOT
VAILABLE

To Stamp out Bovine Tuberculosis

THE UNITED STATES GOVERNMENT is conducting a campaign to eradicate tuberculosis in cattle, and the B. A. I. veterinarians can do only a small part of the actual testing. Practicing veterinarians should stand ready to co-operate to the fullest extent. They should be prepared to give their clients the best advice relating to the matter and they should keep a supply of Tuberculin on hand. We offer:

SUBCUTANEOUS TUBERCULIN.—Bio. 924: 20-cc rubber-diaphragm-capped bottle (5 doses). **Bio. 925:** 100-cc rubber-diaphragm-capped bottle (25 doses). Ready to use. Requires no dilution. Graduated dose table on the label.

INTRADERMIC TUBERCULIN.—Bio. 927: 1-cc vial (5 tests). **Bio. 928:** 5-cc vial (25 tests). Prepared to meet the increasing demand for check tests. Some veterinarians use this test almost exclusively.

OPHTHALMIC TUBERCULIN.—Bio. 923: Vial containing 10 discs. Dose already measured. A great convenience and a time-saver. Use this test in conjunction with the subcutaneous.

It is suggested that some one of the combination tests be employed.

Every lot of Tuberculin we manufacture is doubly tested for potency before release—first on guinea-pigs (the U. S. Bureau of Animal Industry method), and then in the field, under field conditions, on tuberculous cows. This is in addition to our usual sterility and safety tests.

Parke, Davis & Company

Mulford Canine Rabies Vaccine

(SINGLE-DOSE TREATMENT)

For the Prevention of Rabies in Dogs

Convenient — Only one or, at the most, two doses to inject.

Effective — Over 31,000 dogs have been protected by this method.

Safe — A carbolized rabies virus that will not cause rabies in dogs when injected subcutaneously.

Practical — Offers a means to CONTROL and eventually ERADICATE rabies.

Economical — Low cost, within means of every dog owner.

To assist in the control and eradication of rabies, it is suggested that every dog at large when a rabid dog appears in a neighborhood, be vaccinated at once, to check further spread of the infection.

Dosage — A single, subcutaneous injection of 5 Cc. of MULFORD CANINE RABIES VACCINE constitutes the proper dose. If desired, dogs that have been badly bitten may be given two doses, on successive days.

This treatment is preventive, not curative, and should be administered as promptly as possible after exposure to infection.

How Supplied — CANINE RABIES VACCINE (Single-dose treatment) is supplied in 5 Cc. vials, with rubber cap, to permit of the vaccine being easily withdrawn into a syringe, without exposure to contamination.

Price — $2.50 per package—subject to usual biological discounts.

51003

H. K. MULFORD CO., Philadelphia, U. S. A.

Mulford

THE PIONEER BIOLOGICAL LABORATORIES

Lederle

ANTI-HOG CHOLERA SERUM

$1.75 PER HUNDRED

Sold to Veterinarians Only Postage or Express Prepaid

25%

more immunizing value than whole blood

more immunizing value than Watered Clear Serum

These statements based on tests made by Bureau of Animal Industry Washington

LEDERLE ANTITOXIN LABORATORIES

NEW YORK - - - - - 511 Fifth Avenue
CHICAGO - - Marshall Field Annex Building
KANSAS CITY - - - 601 Firestone Building
NEW ORLEANS - - - 105 Medical Building
MINNEAPOLIS - - - - 633 Andrus Building
SAN FRANCISCO - - - - 163 Jessie Street

A NEW
Lederle
PRODUCT

Canine Rabies Vaccine

For the eradication
of Rabies in Dogs

One Injection Method

More than 31,000 dogs have been
immunized by this method

PRICE: $2.50 per package

Write for Booklet

LEDERLE ANTITOXIN LABORATORIES

NEW YORK - - - - - - 511 Fifth Avenue
CHICAGO - - Marshall Field Annex Building
KANSAS CITY - - - 601 Firestone Building
NEW ORLEANS - - - 105 Medical Building
MINNEAPOLIS - - - - 633 Andrus Building
SAN FRANCISCO - - - - 163 Jessie Street

There is an apparent discrepancy

The pages are either missing or t

The filming is recorded as the bo

ıcy at this point.

r the pagination is incorrect.

book is found in the collections.

Tuberculosis

THE control of tuberculosis is at the present time a most acute problem. The campaign against this scourge is being pushed with a concerted effort by all interested in the livestock industry.

Successful control depends on the early and accurate diagnosis of the disease, which can only be accomplished by the aid of potent, reliable tuberculin. The tuberculins produced by the LEDERLE ANTITOXIN LABORATORIES have always proven potent and reliable; therefore, the maximum accuracy is obtained in the reactions from their use.

We recommend the following tuberculin preparations:

Subcutaneous Tuberculin for thermic tests.

Special Tuberculin for the intradermal, intrapalpebral and ophthalmic tests.

Tuberculin Discs for the ophthalmic test.

LEDERLE ANTITOXIN LABORATORIES
511 FIFTH AVENUE
NEW YORK CITY

"Dejem"

Canine Distemper Compound

For Dog Distemper and Its Complications, such as Fever, Ocular, Nasal, Laryngeal, Bronchial, Pulmonary, Cardiac, Stomach, Intestinal, Genito-Urinary, Brain and Spinal Cord Disturbances.

"Dejem" Canine Distemper Compound is a remedy unequalled for dog distemper. When used at the onset of the disease, "Dejem" acts as a specific that cuts and shortens the attack.

Distemper is very contagious and due to a gram-negative germ extremely small in size. When the disease has fully developed, the germ, B. Bronchisepticus, can be found numerously in every organ of the system; in other words, the disease is a generalized blood poisoning (Septicaemia).

In whatever organ the germs lodge, they do great harm to the tissues and structures. Up to the present time, distemper has been treated symptomatically, that is, each part of the system was treated as it was invaded by the germs. This method is decidedly wrong.

"Dejem" directly attacks the germs anywhere in the system:—

1. By PREVENTING their multiplication.
2. By DESTOYING the germs themselves.
3. By NEUTRALIZING their poisons, thus bringing about recovery.

"Dejem" is a triumph of Chemo-therapy and the result of years of closest study of distemper, its treatment and immunization. "Dejem" is not a febrifuge, tonic nor stimulant but is decidedly bactericidal to the B. Bronchisepticus within the system of an infected dog. It gives most prompt and thoroughly good results when used at the beginning of the disease, or before pronounced tissue change has taken place (metamorphosis).

CARE OF DISTEMPERED DOG:—Allow an abundance of fresh air and sunlight; house in a temperature between 60 and 70 degrees; avoid forced feeding; give frequently, a small quantity of heated milk and lime water; offer food only once a day and that consisting of meat or its extracts: don't give the dog large drinks of water. Finally, give the dog "Dejem" according to directions. The doses according to weight are noted on the label of the bottle; begin with the maximum dose in a little water or cod-liver oil every 4 hours. As the dog improves, reduce the frequency of the dose to every 6 hours.

Dogs take "Dejem" readily. It settles the stomach and stops vomiting. No Sera, Vaccines, Bacterins, other medicine or physic necessary. The treatment is simplicity itself. A trial of "Dejem" will convince even the skeptical.

"Dejem" Canine Distemper Compound—$1.50 per bottle; Canada, $1.75. Additional charge of 15 cents for tax and delivery.

(As an introductory offer to the veterinary profession we will send three bottles, shipping charges prepaid, upon receipt of $3.00)

MANGAN & CO., Laboratories

2557 THIRD AVENUE **NEW YORK**

Announcing

the publication of a new Brochure

"The Prevailing Diseases of Swine"

By DR. EDWARD A. CAHILL

Copies will be mailed gratis to Licensed Graduate Veterinarians upon request to the publishers.

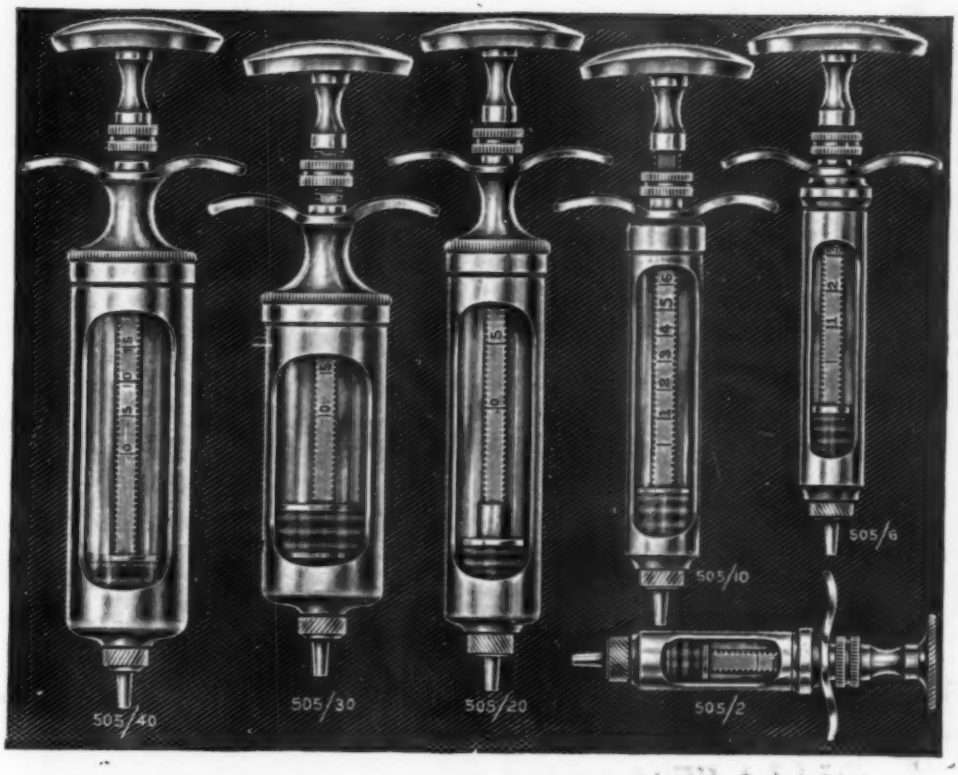
Pitman-Moore Company

PHARMACEUTICAL AND BIOLOGICAL CHEMISTS

Executive Offices—INDIANAPOLIS, U. S. A.

CHAMPION

Syringes and Needles



CHAMPION Syringes may be obtained in 4 c.c., 8 c.c., 12 c.c., 25 c.c., 50 c.c. and 80 c.c. sizes, as well as those shown above.

The distinguishing feature of CHAMPION Syringes is the corrugated rubber packing which reduces the frictional resistance between barrel and plunger to a minimum.

Veterinary Catalog Will Be Sent on Request

BECTON, DICKINSON & CO.,
RUTHERFORD, N. J.

REDUCED PRICES

It is good business to buy where your money will procure the best returns. This does not always mean the largest quantity, because quantity does not always mean quality. To illustrate if you wanted to buy strychnine in solution, you would not take a 1 per cent solution when you could get the same quantity of a 10 per cent solution for the same money.

Then, why buy highly diluted bacterins when you can buy Quality Bacterins for less money? They are heavy concentrations, of high antigenetic bacteria, and contain a large dose of each organism used. Thus, giving from 5 to 13 times as much bacterin, and for a less price than other brands.

Our laboratory director, Dr. E. A. Logan, formerly Professor of Bacteriology in the St. Joseph Veterinary College, and bacteriologist to the St. Joseph Board of Health, by economical methods of production, enables us to furnish you with Quality high-grade bacterins at from 8 to 10 cents per dose.

According to the size of the containers the smaller the container the higher the cost of the finished product.

A trial will convince that "Quality Bacterins are of the highest quality at the lowest price."

Write for Quality Prices

QUALITY BIOLOGIC COMPANY

The People who put the ACT in bacterins

86-88 North James Street, Kansas City, Kansas

DR. E. A. LOGAN,
Laboratory Director

DR. G. A. JOHNSON,
President

A booklet, How to Check the County Agent, will gladly be forwarded upon request.

To protect your own interests use

Eagle Anti-Hog Cholera Serum and Virus with Eagle Mixed Infection Bacterin

EAGLE LABORATORIES

38 S. Seventh St., Kansas City, Kans. Oklahoma City, Okla. Nashville, Tenn.

Special Sterility Requisites

UTERINE CAPSULES

Composed of iodoform, boracic acid and thymol

Per dozen capsules	$2.00
Per gross capsules	20.00

METRITIS MIXED BACTERIN (Bovine)

Per package of 6-2 mil vials	$1.00
Per package of 12-2 mil vials	2.00
Per 20 mil vial (10 doses)	1.20

BOVINE ABORTION BACTERIN (Mixed)

Per package of 10-10 mil vials	$4.50
Per vial 100 mils (10 doses)	4.00
Per vial 200 mils (20 doses)	7.50

These are helping to answer the sterility problems in extensive cattle practices. We have many others in which you may be interested. Literature and list on application. We are headquarters for Sterility needs, Biologicals, Pharmaceuticals and Instruments.

GOSHEN LABORATORIES, Inc.

GOSHEN NEW YORK

REMOVAL

THE VETERINARY

formerly located at Holland, Michigan, Equine and Canine Operating Tables, Dental Halters, Operating Hoods and their factory and offices to

531 South

Chicago,

In Chicago, because of ideal facilities of materials, the best service will be at sion.

At this time the management takes the patronage accorded this institution will be left undone to have all Veteri appliances always the best that can be

To merit patronage is to have it.

Veterinary

531 South Peoria Street

NOTICE

SPECIALTY CO.

Manufacturers of the Simplicity Ajax Stocks, Slings, Harness, Hopples, Chloroform Muzzles, have transferred

Peoria Street
Illinois

for manufacture and prompt shipment the command of the veterinary profes-

pleasure in expressing appreciation of and also gives assurance that nothing nary Specialty Company restraining built.

Specialty Co.

Chicago, Ill.

RESPONSIBILITY

We produce FORT DODGE CLEAR SERUM from start to finish right on our own premises—no guess-work enters into its manufacture.

WE KNOW

that the whole blood we produce is highly potent because WE KNOW we inoculate our "Hyper-immunes" with intensely virulent virus which is bound to produce a serum high in anti-bodies.

WE KNOW

that this whole blood is handled in such a way that it is either entirely sterile when turned over to our Clear Serum department or else has such a very low bacterial count as to be entirely negligible. This gives us a great start toward the production of a Pure Potent CLEAR Serum. If we did not produce our own whole blood and had to buy it on the serum market where we could purchase it to advantage, then we should have to take someone else's word for the purity and potency of the whole blood so procured; we should have to content ourselves with simply clarifying the whole blood produced on other premises; and we could not possibly take the interest in, nor stand back of, the product to the extent that we do with our own CLEAR Serum which we manufacture from beginning to end.

WE STAND BACK

of every drop of FORT DODGE Clear Serum, KNOWING as we do that the virus, the blood serum, the swine, the technique, the equipment, the knowledge, and all else entering into its manufacture represent the highest degree of perfection and are RIGHT in every particular.

FURTHER—

in addition to the prescribed U. S. Government tests, FORT DODGE Clear Serum is subjected by us to microscopic examinations and animal inoculation tests to prove beyond a shadow of doubt that our product is free from any filtrable viruses or pathogenic bacteria.

Insist upon using FORT DODGE Clear Serum—The Clear Serum that has made good upon thousands of swine during the past two years.

FORT DODGE SERUM COMPANY

Fort Dodge **Iowa**

Dr. G. I. Blanchard, Pres. and Sales Manager.

Dr. E. B. Hollecker, Vice-Pres. and Laboratory Supervisor.

MISSOURI VALLEY SERUM OF A HIGHER STANDARD INSURES HOG-HEALTH SERUM TRADE MARK

Dr. Phillip Ritter, Chief Veterinarian

Better Anti-Hog Cholera Serum is made The Missouri Valley Serum Co. makes it

Because It's Throat Bled

OUR BRANCHES

Missouri Valley Serum Company, 646 No. Main St., Dayton, Ohio
Dr. T. W. JOHNSTON in charge

Missouri Valley Serum Company, 412 Pennway Bldg., Indianapolis, Ind.
Dr. L. E. NORTHRUP in charge

Missouri Valley Serum Company, 610 So. 3d St., Evansville, Ind.
Dr. G. J. BEHRENS in charge

Missouri Valley Serum Company, Foot of South St., Peoria, Ill.
Dr. J. F. ROSER in charge

Missouri Valley Serum Company, 636 E. Grand Ave., Des Moines, Iowa
Dr. E. W. HANSON in charge

Acme Chemical Company, 474-476 Edison St., Milwaukee, Wis.

Roy Dickerson, 300 Broadway, Logansport, Indiana.

Order from the Branch Nearest You

A supply of fresh Throat Bled Serum and Virus, also a full line of veterinary biologics and instruments for their administration are carried on hand at all times by the above Branches.

Your orders will be given prompt attention.

MISSOURI VALLEY SERUM COMPANY

50 North 2d Street **Kansas City, Kansas**

SWAN-MYERS

Hemorrhagic Septicemia Bacterins

The prevention and treatment of Hemorrhagic Septicemia with bacterins has given most encouraging results. The early use of the proper bacterin will, in most cases, prevent the appearance of the disease even in those which have been exposed, while the early administration of large doses to infected animals commonly results in a lowered temperature, a marked improvement, and a rapid recovery.

Swan-Myers Hemorrhagic Septicemia Bacterins are prepared by the same staff of highly trained bacteriologists and under the same methods and controlled by the same rigid tests that have obtained the marked success of Swan-Myers Bacterins for human use.

The following bacterins are indicated as a prophylactic and treatment for Hemorrhagic Septicemia in its various forms:

Bovine Hemorrhagic Septicemia Bacterin No. 113

Mixed Infection Bacterin for Swine No. 116
(Complicated Hemorrhagic Septicemia)

Avian Hemorrhagic Septicemia Bacterin No. 122

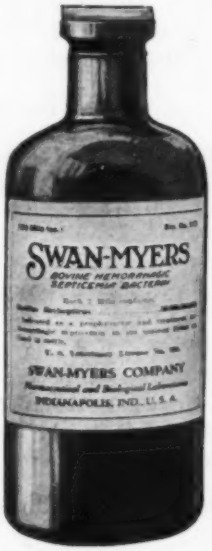
Swine Plague Bacterin No. 115
(Hemorrhagic Septicemia in Swine)

Equine Hemorrhagic Septicemia Bacterin No. 118

Ovine Hemorrhagic Septicemia Bacterin No. 117

Prepared in 20 mil (Cc.) bulk packages at $1.20 and 100 mil (Cc.) bulk packages at $5.00

U. S. Veterinary License No. 104



SWAN-MYERS COMPANY

Pharmaceutical and Biological Laboratories

INDIANAPOLIS, U. S. A.

LBMJ '22

THERE *IS* A REASON

for the enthusiastic reports which we are receiving from practitioners and canine specialists who are using our

ANTI-DISTEMPER SERUM (CANINE)

The reason is **superior results.**

ANTI-DISTEMPER SERUM (CANINE) is prepared from the blood of horses hyperimmunized against virulent strains of B. bronchisepticum, isolated from acute cases of canine distemper.

Dosage—Therapeutic: 10 to 30 mils, repeated each twenty-four hours until the desired result is obtained. Prophylactic: 5 to 10 mils.

Code
Sabum—20 mil vials
Sabux—50 mil vials

DISTEMPER MIXED BACTERIN (CANINE) contains in each 2 mil (c.c.) dose 20 billion killed bacteria as follows:

B. bronchisepticum	40%
Streptococcus	30%
Staphylococcus albus and aureus (combined)	30%

All isolated from acute cases of canine distemper.

More active immunity of longer duration is obtained if, following the initial injection of Anti-Distemper Serum (Canine), this bacterin is administered.

Code
Befar—20 mil vials
Befel—50 mil vials
Befit—Package containing three 2 mil vials

The above products are in stock at all our branches and distributing agencies.

PITMAN MOORE COMPANY

CHEMISTS

Indianapolis U. S. A.

A
TETANUS ANTITOXIN
For
LICENSED, GRADUATE VETERINARIANS ONLY

PITMAN-MOORE TETANUS ANTITOXIN is now ready for the market—*our market,* which is the licensed, graduate veterinarian *only.*

PITMAN-MOORE TETANUS ANTITOXIN is supplied in all standard strengths, in both syringe and vial packages, and at attractive prices.

In potency, PITMAN-MOORE TETANUS ANTITOXIN tests exceptionally high, resulting in dosage of small volume, which makes for convenient and easy administration.

The absolute sterility of PITMAN-MOORE TETANUS ANTITOXIN is guaranteed by rigid tests, both of the bulk product and after filling into the final containers.

Telegraphic orders may be sent by the following code:

In Syringe Packages	**In Vials**
Code:	Code:
Tade — 500 units	*Tan* — 500 units
Taffy — 750 units	*Tape* — 750 units
Tags —1,500 units	*Tart* —1,500 units
Tally—3,000 units	*Task* —3,000 units
Tame—5,000 units	*Tawny*—5,000 units

PITMAN-MOORE COMPANY

Pharmaceutical and Biological Chemists

Indianapolis **U. S. A.**

TUBERCULIN

For

LICENSED, GRADUATE VETERINARIANS ONLY

PITMAN-MOORE TUBERCULIN is now ready for the market—*our market,* which is the Licensed, Graduate Veterinarian *only.*

PITMAN-MOORE TUBERCULIN is supplied as follows, and may be ordered by the code given below:

TUBERCULIN, SUBCUTANEOUS

Code:
Tabad— 20 Cc. vial (5 tests)
Tabef—100 Cc. vial (25 tests)

TUBERCULIN, OPHTHALMIC DISCS

Code:
Tabig—Package containing 5 tests

TUBERCULIN, INTRADERMIC

Code:
Tabor—1 Cc. vial (5 to 10 tests)
Tabux—5 Cc. vial (25 to 50 tests)

TUBERCULIN, TRIPLE STRENGTH
(For retesting)

Code:
Tripe— 20 Cc. vial (5 tests)
Trist—100 Cc. vial (25 tests)

PITMAN-MOORE COMPANY

Pharmaceutical and Biological Chemists

Indianapolis **U. S. A.**

BE PREPARED

for the calls you will soon receive, to immunize against, and to treat

EQUINE INFLUENZA

In the preparation of our biologics for this purpose, we have followed the best known methods for producing a bacterin of the highest antigenic value, and a serum of the greatest anti-bacterial activity.

Equine Influenza Mixed Bacterin

contains in each dose **60 billion** killed organisms, in the following proportion:

Streptococcus Equi	40%
B. Equisepticum	30%
Staphylococcus aureus (equine)	15%
Staphylococcus albus (equine)	15%

Supplied as follows:

Code
Bind—Package of six 2 c.c. vials (6 doses)
Bisk—20 c.c. vials (10 doses)

Anti-Influenza Serum (Equine)

is prepared from the blood of horses hyperimmunized against highly virulent strains of the bacteria regularly isolated from acute cases of equine influenza. The therapeutic dose is 50 to 100 c.c., to be governed by the size and condition of the animal, repeated as indicated.

Code:
Sadit— 20 c.c. vials
Sadon— 50 c.c. vials
Sadug—100 c.c. vials

Order now—these products should be in your stock at this season.

PITMAN-MOORE COMPANY

CHEMISTS

Indianapolis U. S. A.

PURITY ANTI-HOG CHOLERA SERUM stands for everything the name implies.

PURITY CLEAR CONCENTRATED ANTI-HOG CHOLERA SERUM is the SUPERIOR SERUM.

PURITY HOG CHOLERA VIRUS is always Virulent. It not only passes the Bureau tests but must be satisfactory to our laboratory Directors.

PURITY HEMORRHAGIC SEPTICEMIA AND MIXED VACCINES are standardized by weight. They are made from fresh field strains of pathogenic organisms and always give results.

"To Veterinarians Only, and One Price to All"

Purity Biological Laboratories

SIOUX CITY, IOWA

ANTIPHLOGISTINE

Is a valuable aid to *Veterinarians* in

EQUINE BOVINE CANINE FELINE PRACTICE

PNEUMONIA	INFLATED GLANDS
TENDINITIS	ABSCESSES
SPRAINS	BRUISES
SCRATCHES	BURNS
ORCHITIS	BOG SPAVIN
CAPPED KNEE	HARNESS GALLS

Yield Promptly to

ANTIPHLOGISTINE

Applied hot and thick and covered with cotton.

Send for Booklet and Sample

The Denver Chemical Mfg. Co.

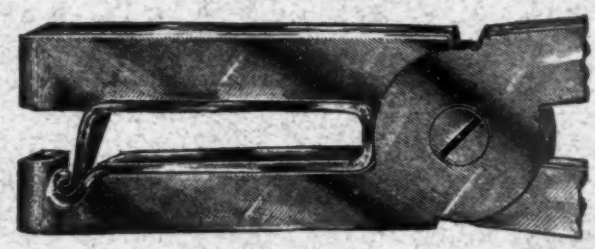
New York

One Simple, Easy, Quick Operation, and the

Jen-Sal

Peerless Aluminum Ear Tag

is there to stay



Showing Tag Completely Closed

Originated, patented and manufactured by the Jensen-Salsbery Laboratories, Kansas City, Mo., exclusively.

Peerless Ear Tag

As a permanent identification marker we guarantee that the piercing point will not get out of line on the Peerless tag. No spoiled or wasted tags.

Deliveries. We have installed equipment for the complete manufacture of this tag in our laboratory building, thus insuring that orders requiring your name and special numbers can be filled the same day they are received.

Send for samples and special quotations on larger quantities than 1,000

J. S. 4594—Cattle Size

Quantity	Name and Address	Name Address and Number
25	$ 2.00	$ 2.65
50	2.75	3.50
75	3.50	4.45
100	4.25	5.25
200	7.25	8.75
300	10.25	12.25
400	13.25	15.75

J. S. 4594—Cattle Size

Quantity	Name and Address	Name Address and Number
500	$16.25	$19.25
600	19.25	22.75
700	22.25	26.25
800	25.25	29.75
900	28.25	33.25
1000	31.25	36.75
Add'l 100	3.00	3.50

J. S. 4600—Peerless Ear Tag Pliers.....$2.00

The Jensen-Salsbery Laboratories, 520 W. Pennway, Kansas City, Mo.

Haywoeth Publishing House, Washington, D. C.